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# MAXIMUM DRIVE

Issue No. 6 November/December 2015

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# On the Boulevard

In everyone's life there are absolutes, things that, for reasons that can or cannot be explained, have an undeniable ring of truth. I'll readily admit to at least three of my internal forces. One, I love the print world. I'll look at an e-zine, but I'll read a magazine. Two, I'm a big Jackson Browne fan, hence the theme of this column. Three, I'm an even bigger muscle car geek. I enjoy them all, be they modern, classic, traditional, unconventional, restored, modified, low-production, mass-produced, under-appreciated, over-hyped, GM, Ford or Mopar, even those from AMC.

I've been fortunate enough to own a number of muscle cars throughout the years, including most of the '70 Trans Am models (Z28, AAR, Boss 302). Never did find a Donohue Javelin, however. Perhaps that's why there's an underlying current that runs through this issue of *Maximum Drive*. Everything relates to the street. If you've got it and won't drive it, you shouldn't have it. All the feature cars are road killers, and all of the content of the technical articles is about enjoying the drive.

This issue's feature cars all have their own unique personality and story. Carson Lev covers the unconventional category with his amazing '59 Bel Air. There's Jim Hetrick's A/FX Dodge that's a classic low-production model, and Richard Rollins' one-of-a-kind Challenger qualifies as a no-production build. Simon Wehr elected to run on the modern side of the street with his Camaro, and Tom Fansworth's GTO Judge is our modified entry.

Two very interesting builds were Jerry Bentley's '62 Corvette. It started out as classic and restored

but ended up as neither. However, it's the story of Robby Taylor's '65 Mustang that may be the most important. It's a farther-son account of how the car guy gene has been passed down from one generation to the next. It's a tradition that we all need to see become more common.

Getting back to my Trans Am fixation: The early days of this style of racing continue to influence the entire American performance scene. "The Trans Am Effect" is a trip back in time when the Big Three (and Little One) created the coolest cars on the planet only to be reinvented as today's biggest showroom rivals.

You'll find that this edition's tech stories don't fall into the typical how-to category. As the guest editor, I wanted to add some concept and theory to the pages with reports on modern supercharging for the street, how to improve your power-to-weight ratio, getting a better grip from your clutch, and introducing a new Ford engine that skirts the boundaries between street and strip.

The final piece was Aaron Smith's 707-hp ride in the new Viper ACR. Finally, there's a walk down 1,320 feet of history at The Wally Parks NHRA Museum. This is where the real roots of the muscle car came from with the fearless men that forged new frontiers of speed, like our own Tom "the Mongoo\$e" McEwen.

When you reach the back cover, I hope you'll find that nothing was over-hyped. As for under-appreciated, that's a feeling I will never have for the talented and humble *Maximum Drive* team. They've all been great to work with on this issue.

In the very near future I'm looking to have my latest project back on the road. So, here's to seeing you on the Boulevard and Lawless Avenues, and wishing you'll never be "Running on Empty." **MD**



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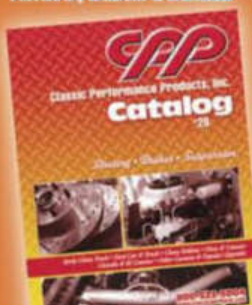
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# Pump *it Up*



## The Return of *Plum Crazy*

**W**hen it was released in 1970, the Dodge color pallet was one of the wildest and most desirable of the muscle car era. Perhaps the most memorable of all those bold hues with the wacky, creative names was Plum Crazy. The color will return for a limited run within the Challenger and Charger lineup.

Production is slated for mid-November.

Selected dealers were allowed to take orders in September. The color will be available on the SXT Plus, all R/T models and all SRT versions, including the Hellcat. Plum Crazy was last available on Challengers in 2014 with just 1,320 available. That same year only 658 R/T and SRT Chargers were painted that color. Less than 12% of the total Challenger and Charger production is scheduled to be Plum Crazy.

The most rare of all the limited edition colors ever offered on the Challenger since 2008 was PW7, Bright White, with only 51 made in 2014. For 2006 and newer Chargers, that distinction goes to the 2013 SRT8 and SRT8 Super Bee in PLC Hemi Orange with a production run of only 48 units.

### Those nutty Dodge colors:

Go ManGo, Top Banana, TorRed, Plum Crazy, Sublime, Pitch Black, Toxic Orange, Blue Streak, Stinger Yellow, Copperhead, Furious Fuchsia, Green with Envy

## Add to the *Snake Farm*

**D**odge Viper owners Wayne and D'Ann Rauh have taken the term "snake charmer" to a whole new level. This past summer the couple visited the Conner Avenue Assembly Plant in Detroit to receive keys to not one, but two new customized "1 of 1" Dodge Viper GTC models. This made them the proud owners of a total of 79 Dodge Vipers.

This past winter, Dodge created a new Viper "1 of 1" customization program that allowed buyers to create their very own, one-of-a-kind Snake. No two customers can order the same configuration, including color, in the same model year. With the introduction of matte-finish exterior paint, the 2016 Viper is now offered in more than 50 million unique build configurations, made up from the more than 16,000 unique paint color options and more than 48,000 unique stripe combinations. This gives Viper customers the ability to create and order a truly one-of-a-kind, hand-built American supercar.





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## Hot off the Block

Depending on your point of view, or if you're a buyer or a seller, the list of six-figure cars continues to rise. Whereas Hemi 'Cudas, Yenko Camaros and Shelby Mustangs have been in the \$100,000 club for many years, the list of muscle car royalty is being joined by more and more models with each event.

A few of the makes and models in the fast lane to 100k include the '70 Chevelle LS4, '70 'Cuda AAR, '69 Pontiac GTO Judge, '62 Impala SS 409, '58 Corvette, '62 Corvette, '01 Mustang Cobra R.

## 2016 Topless Camaro Released



Chevrolet's newly engineered Camaro convertible is scheduled to arrive at a dealership near you early in the new year. The 2016 model is the first Camaro to offer a completely automatic operation with latches that release and secure the top. The 2016 also automatically deploys the hard tonneau cover so there is no soft or semi-soft tonneau cover to affix or store.

More importantly, the 2016 model has a stiffer, lighter structure that is now 200 pounds lighter than the 2015, the chassis is more rigid, which is reflected in a more nimble feel and reduced transitional response time.

The 2016 Camaro convertible will be available in all six powertrain configurations, from the 2.0L Turbo (275 hp) to the SS with 455 hp.



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16x8	\$124	\$144
Caps	\$15	
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CHROME



SILVER



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15x5	\$114	\$114	\$144	\$144	\$104	\$104
15x6	\$114	\$114	\$144	\$144	\$104	\$104
15x7	\$119	\$119	\$149	\$149	\$109	\$109
15x8	\$119	\$119	\$159	\$159		
16x4.5	\$144	\$144				
16x6	\$149	\$149				
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18x8	\$135	\$170	\$210
18x9	\$159	\$194	\$219
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# LEVERAGE

The Flight of the Omnipresent Red Phin

TEXT BY ALAN PARADISE ■ PHOTOS BY GUY SPANGENBERG





■ Behind the Foose billet wheels and fat Pirelli rubber are Baer four-piston calipers hooked to 13-inch cross-drilled rotors. Hotchkis engineered the suspension featuring Bell Tech 3-inch drop spindles with air-ride assist.

■ A design element that caused a stir back in 1959 still evokes a similar reaction today. The cat-eye taillights and unique body trim make building one of these cars a challenge. Very few exterior or interior pieces are available as surviving original equipment, and there has been little call to create NOS.



**There is something** obviously special about milestone automobiles with their elements and styling cues that endear us to particular makes and models. Some of these elements are subtle, like the stainless steel body-trim of a '57 Bel Air or the unique shape of a '63 split-window Corvette. Others are more menacing as in the hockey stick Hemi on the '70 'Cuda or the cheese-cutter body shape of a Testarossa. These features help bring presence to a car. Then there are cars that seem to have an aura all their own, like a Chrysler Prowler or Shelby Cobra.

Every now and again an automotive design that is long gone and forgotten or perhaps one that was once so common it was overlooked at first, resurfaces in an example that commands a new level of respect and admiration. Such is the case with one very special, last of the '50s Chevrolets and its equally special and unique owner.

Before we get too far with the who, what, where and why of the build, it's important to understand why the '59 and '60 Chevrolet line should be considered historic.

For 27 years, beginning in 1932, Harley Earl guided the design of every General Motors







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FOR 27 YEARS, BEGINNING IN 1932, **HARLEY EARL GUIDED THE DESIGN OF EVERY GENERAL MOTORS PRODUCT.**  
HE WAS FAR AND AWAY THE GREATEST AUTOMOTIVE STYLIST THE INDUSTRY HAS EVER KNOWN.

---







product. He was far and away the greatest automotive stylist the industry has ever known. He was the creator of the concept car and the father of the Corvette. He ushered in tailfins, bumper bullets, two-tone and tri-tone paint schemes. He was the first to hire female stylists and experiment with aerodynamic principals. Every classic shape that emerged from Detroit from 1932 to 1960 has his fingerprints on it. The '59 Chevrolet was the last model



that Earl had a direct hand in creating. After he retired in 1958, his long-time right-hand man Bill Mitchell took over as head of styling. With that came leaner trim, lower beltlines and cookie-cutter styling.

Fast forward to 2002. As groundbreaking as the design of the '59 Chevrolet was—with its batwing rear deck, cat-eye taillights, fender birds and toothy grille—the car was lost in time. It had taken a back seat to the shoebox 1955–57 lines and the unique '58, not to mention the scramble for the 1961–63 Impala models. But Carson Lev, at the time head of branding and marketing for Mattel Hot Wheels, saw the hidden aura surrounding Earl's final Chevrolet edition.





A FEW WEEKS LATER, THE BEL AIR ARRIVED VIA COVERED TRANSPORT. FROM THAT DAY ON, WHAT HE THOUGHT WAS GOING TO BE A SHORT-TERM PROJECT CAR, TURNED INTO A LONG-TERM LABOR OF LOVE.



Lev is no stranger to the performance and custom car community. In fact, he's been a steady participant even before he reached driving age. As a pre-teen he was a regular at a little neighborhood drag strip near his childhood home, a place called Lions. "Since I was in high school, I've always had some sort of muscle car or hot rod. The list is pretty long: a '65 Mustang, a couple of Z/28 Camaros, a '32 Ford, '55 Bel Air, Impala SS—you know, the usual stuff," Lev recalled.

It was a little over 12 years ago when something out of the ordinary caught his eye. "While on a business trip in Colorado, I came across a '59 Bel Air at, of all places, a Corvette restoration shop. It was freshly painted but far from complete. But, that didn't matter at the time. The body, with the wing-shaped trunk and unique chrome trim spoke to me. Looking at it, I suddenly realized that all the great cars I have had were kind of 'me too' cars. This was something completely different," he admitted.

Lev made a deal to purchase the car before heading back home to Los Angeles. A few weeks later, the Bel Air arrived via covered transport. From that day on, what he thought was going to be a short-term project car, turned into a long-term labor of love.

There's always risk when stepping out of the mainstream. Unlike building a '57 or '62 Bel Air, parts and practices for a '59 or '60 are rare and mostly untried. "It wasn't like you could call up a buddy and say, 'How does this or that fit or will these items work?' because no one I knew had done what I was trying to do," Lev said. The first step was to sort out the mechanicals. He went to Don Hardy, a trusted friend and engine builder for a recommendation. Shortly after, a Corvette Grand Sport LT4 motor was delivered. However, before dropping it into place, the block was cleaned and painted PPG Torch Red to match the body. While this was in progress, the body and frame were separated and the old





Chevy underpinning was powder coated. From here the progress really got interesting.

It wasn't enough to have one of the last designs that had Earl's DNA; Lev added the touch of another legendary automotive creative master, Chip Foose. Lev and Foose had been close friends for years and worked together on Hot Wheels projects dating back to the time when Foose worked with Boyd Coddington. "Chip

and I have a great history together. When I was at Mattel, we worked together to create the full-size versions of the Twin Mill and Deora II. So, it seemed only natural to get his take on such an unusual project," said Lev.

The Lev/Foose collaboration pushed the project to new levels. To achieve the desired stance but still retain excellent ride quality, John Hotchkis was asked to engineer the suspension. The Hotchkis team started with Bell Tech spindles. A tubular suspension was built aided by an electronically controlled air-ride system to optimize ride quality and handling at various heights. Baer multi-piston calipers and 13-



■ Little details go a long way, such as this braided aluminum hose that houses the transmission dipstick.

■ Chip Foose designed Red Phin's interior that called for Katzkin leather in black and red separated with white accent piping. The steering wheel with center bullet and factory-looking horn ring really connect the car to its Harley Earl roots. The tilt column is from ididit.

inch drilled rotors were applied to all corners. Driveline Specialties installed a two-piece billet yoke into the solid rear axle with 3.73:1 gears.

There's an old belief that tires and wheels make the car. However, the suspension makes the tires and wheels. These interconnected elements must work together to accomplish the right look. For this Foose offered up his 20-inch Nitrous billet aluminum wheel design. "The most important issue was getting the offset exactly right. Chip and I took three trips to the



factory before it was perfect. It was a lot of work but well worth the effort,” explained Lev.

As the wheels were being sorted out, a set of rollers stood in as the engine and transmission were dropped in. The Don Hardy-assembled LT4 was attached to a Dave Killackey-built GM 4L-60E tranny. Rob Phillips at PCH Rods was the trusted talent to assemble all of the components. Phillips added a Watson aluminum radiator and performed all of the wiring and computer controls.

Now that the Chevy was road worthy, Lev turned his attention to the interior design and audio components. Foose designed the interior using many original GM elements. At this point, Lev called in another industry contact, Mitch Katz of Katzkin Leather. Although Katzkin is the premiere supplier of aftermarket leather interiors, they rarely take on one-off projects. But, this was different and Katz wanted to be a part of it. The black and red leather was designed and stitched to have ties to the original Chevy showroom two-tone style with a more modern flair. Door panels were created with black leather pleats with oversized white piping. The dash was color matched and fitted with Auto Meter gauges, white face on the vitals and classic white-on-black Pro Comp for the speedometer. The final touch was an ididit column with billet gear selector, tilt and signal stems.

The car became known as Red Phin by the circle of professionals who applied their talents to



**IF THE DESIGN OF THE '59 CHEVROLET LINE WEREN'T ENOUGH OF A RADICAL DEPARTURE FROM THE PREVIOUS YEAR, THIS WAS ALSO THE TIME CHEVY RELEASED ITS FIRST EL CAMINO.** It was basically a two-door wagon with a bed in place of back seats and the rear window pushed forward. It was GM's answer to the Ford Ranchero and replaced the slow-selling Cameo Carrier pickup truck. Just 22,246 El Caminos were sold. In contrast, 447,100 Bel Airs were produced that model year. To put that into perspective, in 1957, Bel Air sales were 702,220. Perhaps the world wasn't ready for the unique styling of the '59 Chevrolet.



■ The trunk is no longer the place for luggage or sneaking buddies into the drive-in movies. Red Phin's space was used to house the ARC amps, crossovers and equalizers. The system can bump the bass, but it can also deliver a crisp and clean concert hall sound. Note the extension of the Foose/Katzkin interior design.







■ The Don Hardy-built LT4 small-block Chevy engine has been dyno tuned to 340 hp. Prior to assembly, the block was treated and painted Torch Red as were a special set of valve covers and the intake cover. Air filter is K&N. A four-row Watson aluminum radiator is responsible for cooling. The special ceramic headers run to dual Magaflo mufflers.

the unique street machine. As it neared completion (as least for the time being) the new Foosé wheels were matched with Pirelli P-Zero tires, 255/35-20 front and 275/55-20 rear. When the aluminum and rubber were bolted on, it was time to stand back and say “ah.” Or in this case it was more like “awe.”

There was only one element yet to execute. The tasteful and respectful ARC audio components with an Eclipse head unit were installed at Audio Shoppe in Riverside, California. “It has enough wattage to thump some hard bass, but I prefer tunes that are a little more period-correct,” Lev said.

Despite the carefully planed construction and high-quality components and build, one might believe that Red Phin would be a garage dream or trailer queen. Nothing could be further from the truth. Lev and the '59 are SoCal regulars. Cruise night at the NHRA Museum, he's there. Weekend at the Del Mar Goodguys events, he's there.



■ This is why they call these models the batwing cars. Mitch Lanzini gets credit for squirting the PPG Torch Red glamour coat. Artistic Silver Plating restored the trim and chrome plating.

Pomona Swap Meet, you guessed it. Donut Derelicts on a Saturday morning, he's parked in the front row.

Carson Lev is one of those guys that appears wherever the car action is, large or small. He even managed to get a cameo appearance in the feature film *Snake & Mongoose* as the Lions track announcer.

“People either love the Red Phin or hate it. It seems to evoke that type of reaction,” Lev said. From what we experienced, more seem to feel the former rather than the latter. It's a unique application of a rare and wonderful model. Was it risky? No doubt. But there is something special about a guy willing to be a “me first” rather than a “me too.” It is that attitude that has made Red Phin a modern-day milestone performance custom, created by one of the most genuine and humble people in the automotive industry. **MD**



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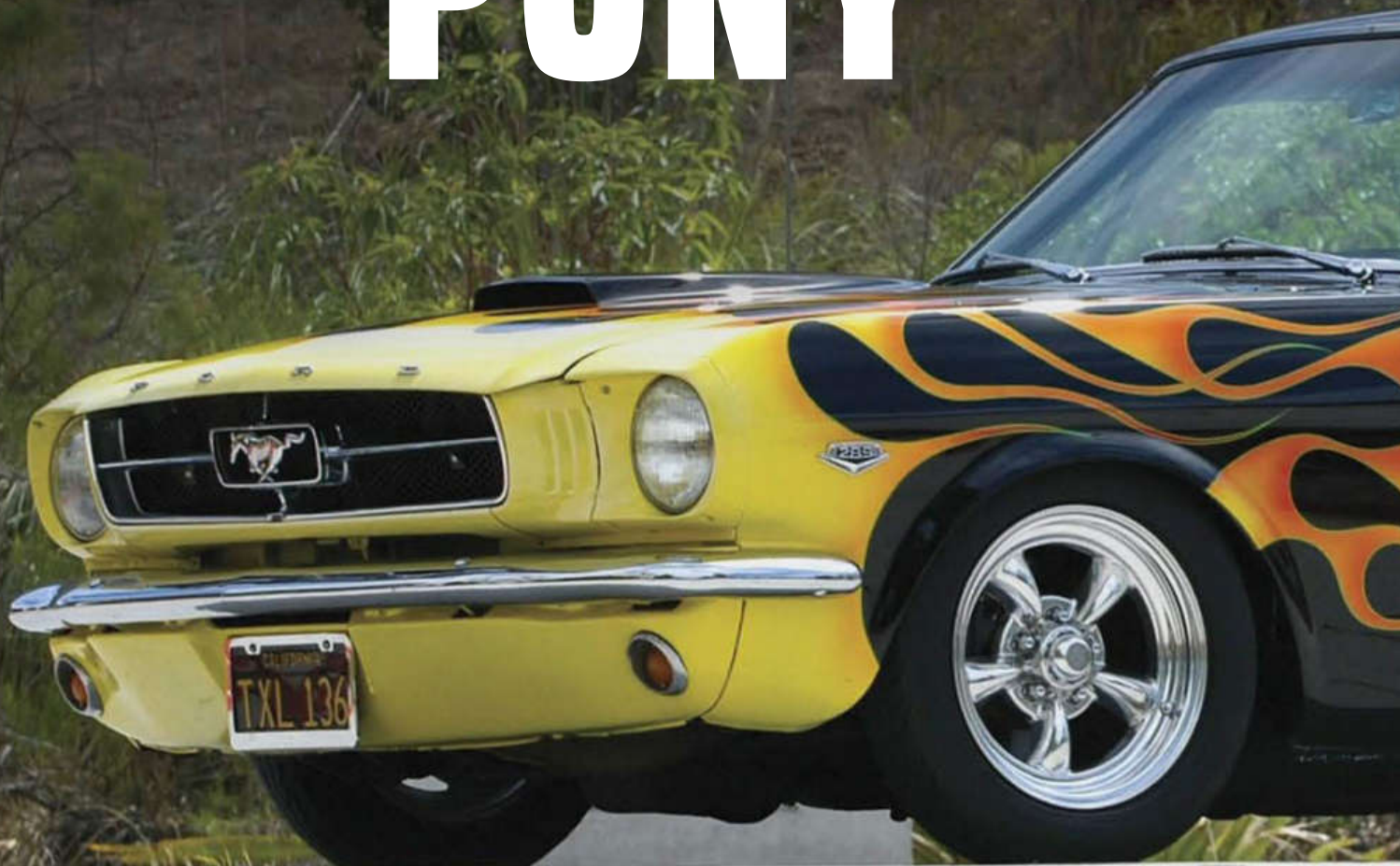
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# SON OF A TRICK PONY



**Every parent wants** their children to have a better life than they had; it's a natural, unselfish drive that spontaneously happens once you bring a child into the world. Twenty-two years ago, that's the feeling that overcame Rob Taylor. Now, two decades and two years later, Robby Taylor of El Cajon, California, has some pretty big automotive shoes to fill.

Long before Robby was even a glint in anyone's eye, his father was well on his way to becoming one of Southern California's most

talented and influential custom painters. The elder Taylor was deeply immersed in the SoCal street scene of the '70s and '80s. Rob's signature ride was a bad-ass '65 Mustang coupe that could go as good if not better than it showed. The basic black coupe was a regular invitee on the ISCA and CSH show circuits. Known as One Trick Pony, it was a prime example of the ideal combination of speed and beauty. Every year, Rob would strip down and



## A Second Generation of Street Performance

■ TEXT AND PHOTOS BY RYAN MATTHEWS



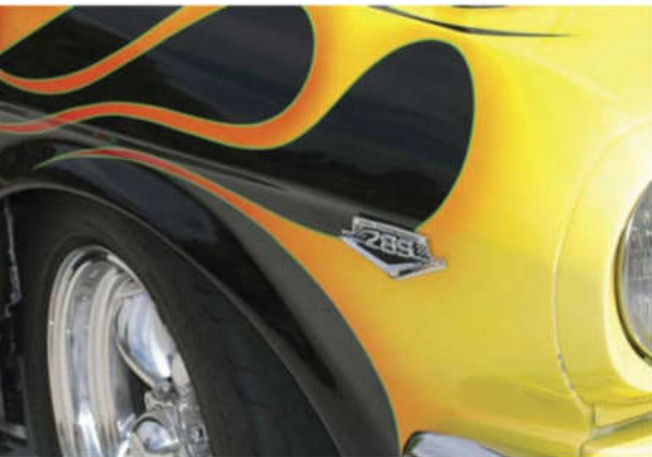


repaint his car to keep the look fresh. One time it was flamed, the next scallops, the next graphics. It became the ultimate calling card for his shop, Kustom Auto Graphics.

At Carlsbad Raceway, the local track in San Diego County, One Trick Pony could lay down some pretty fast times. The built Ford small-block went through a number of intake systems, but it was the dual Holley 600s on an Offenhauser tunnel ram projecting through the hood that created the biggest buzz. This was also a formidable street combination with 4.56:1 gears inside a chrome-plated 9-inch rearend. In other words, Rob didn't lose many street races mainly because he received few challenges.

Life has a way of balancing the scales. Over time, Kustom Auto Graphics grew to be a 12-15-hour a day, six days a week business. The comings and goings of rods, customs, lowriders and the crazy days of mini-trucking left little time to cruise, show and race. The Mustang was parked for a while. A while turned into a year, then two. In the meantime, Rob met a woman who changed his entire life. Karen and Rob were married some time later. Priorities continued to shift as the Mustang remained in limbo. Finally, faced with shop space issues, Rob decided to put the car in long-term storage.

When Robby was born a year later, followed by daughter Megan two years after that, and with business booming, Rob's car show, drag race and cruising days were way in the past. He had no regrets; however, Karen could see that there was a little something missing. Rob was a car guy and she encouraged him to bring One Trick Pony back to life. Rob performed a full revitalization of the 'Stang with a fresh paint job, rebuilt engine and updated interior and audio system.



# The Build

THE FATHER-AND-SON Mustang project began when Robby was just 14 years old. It was "learn by doing" as the car was gutted and bodywork was necessary. Once the rust and dust had been cleared out, Robby (with guidance from father Rob) sprayed the primer. Once the black was applied, Rob layed out the flames. Three years later, the car was ready for its high school debut.



The car was ready for its debut. However, there was a small problem, things had changed and not for the better. Carlsbad Raceway had closed, the cruising spots were now filled by mini-trucks and import tuner car enthusiasts, and both ISCA and CSH no longer held custom car, rod and motorcycles shows on the West Coast. He, once again, had one of the "bitchinest cars in the valley," but nowhere to take it.

After appearing on magazine covers and making it to several local shows, One Trick Pony was again relegated to the garage, spending most of its time under a cover. Rob decided it was time to let go. An acquaintance from the church his family attended had often inquired about buying the car, and now Rob was ready to take him up on his offer. The deal was done. This time regret soon followed.

When a car guy has a son, there's hope but no guarantee that the automotive gene will be passed along. At first it was hard to tell. However, the older Robby got, the more of a car guy he became. The first signs were drawings, then came model building and eventually he was working alongside dad at the shop. At the transformative age of 13, talk turned to the all-important driver's license just three years away.

With Robby growing into a full-blown car geek, he didn't lean toward the import space or go through the off-road truck phase. He skipped those distractions and decided to go with old school performance, just like dad. Now Rob's seller's regret really set in.



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At this point, One Trick Pony had been out of the Taylors' control for several years. This, however, did not deter Rob from making numerous earnest attempts to reacquire his old steed. The motivation was clear: to create a father/son project with a VIN that was like an old friend. Each and every attempt came up empty. This left Rob with one option, to find a donor Mustang coupe and begin the process all over again. This turned out to be, surprisingly, a far more enjoyable option.

■ **Low-back factory Mustang bucket seats were covered in black and gray leather. Year One was the source for the headliner, carpet and door panels, window cranks, sill plates and latches. The racing-style belts are a nice touch.**

Father and son went in search of a project Mustang. Specific requirements were a priority: only a '65 coupe would do, no fastback or convertible models. Numbers-matching did not matter. A manual transmission model was preferred, even if it started life as a base six-cylinder with a three-speed. Since there were 500,000 Mustang coupes that rolled off Ford's assembly line in 1965, locating several to choose from was not an issue. However, no sooner did the hunt begin, than the car literally came to them.

An old client of Rob's had a '65 coupe in his backyard and was looking to sell it. The timing couldn't have been better. "It was basically a running car with a 302 in it, but it had been sitting for years. It had a pretty rough interior

**THE LATEST MUSTANG  
IN THE TAYLOR CORRAL MAY  
NOT HAVE THE STREET-  
RACING PROWESS OF ITS  
COHORT FROM THE PAST,  
BUT IT'S MORE  
DRIVABLE. AND DRIVE  
IT DOES.**

and some rust issues. In other words, it was a perfect starter car," Rob explained.

Work started on multiple fronts. With the help of Jessie Mendez Auto Body, also in El Cajon, the body was stripped of what little trim there was and the rust was repaired. The hood was replaced with a Shelby GT-350 reproduction with functional hood scoop. The body was sanded down to bare metal and all imperfections were hammered out.

While this was happening, the interior was gutted from ratty headliner to rotted carpet. A new dash was installed with factory gauges. The stock bucket seats and rear bench were covered in black and gray leather.

Because they weren't concerned with having a numbers-matching car, the 302 engine was pulled and sent to C.A.R. Automotive of El Cajon to be freshened up. The idea was to keep it old school; so, the block was punched .30-over and

■ **Extra narrow 15x4 American Racing Torque Thrust wheels were ordered for the front Mickey Thompson Sportsman tires. The springs are from Eibach with KYB shocks.**







■ ABOVE. Robby was never caught up in the tuner craze. Instead, this 22-year-old preferred to follow his father's automotive lifestyle. The flamed Pony has the street race stance to go along with the proper exhaust note.

fitted with a solid steel crank, 10.1 TRW pistons and a Comp Cams solid lifter setup. The heads were ported and polished and seated with angle-cut valves. An MSD ignition was added. An Edelbrock Torker manifold and Holley 750 four-barrel carburetor handle the intake with Thorley headers leading to an Ed Hansen custom exhaust with Flowmaster mufflers.

A Ford Toploader four-speed transmission was installed with a Ford Performance clutch, the same used in the Shelby GT-350, and mated to a Hurst shifter. A balanced driveshaft was installed with a



■ Year One was the go-to for a complete dash with gauges. The steering column with signal tree was new-old stock. The LeCarra steering wheel adds the street race touch as does the old school column-mounted white face Sun tach.



driveline loop. The Ford 8.5-inch Trac Lock rearend was fitted with a 3.89 Richmond gears. Lakewood traction bars were added to keep the Mustang moving forward.

The front suspension was spiffed with Eibach springs and KYB shocks. The brakes were upgraded from the 10-drums to a Master Power disc conversion. The final touch was getting the vintage tire and wheel combination. American Racing Torque-Thrusts were the logical choice, with 15x7s on the rear and specially made 15x4s up front. Tire selection was BFGoodrich 215/60-15 rear and Mickey Thompson Sportsman S/R guiding the front.

■ That '70s look is carried forward by the 15x7 American Racing wheels and 215/60-15 BFGoodrich tires. The rear stance was dropped 1 inch using vintage lowering blocks that pushed up the factory leaf springs. KYB performance shocks were also installed.



# THE ORIGINAL One Trick PONY

**T**HESE VINTAGE PHOTOS show Rob's original Mustang coupe in just a few of its variations throughout the 25-plus years he owned it. It was a street/strip/show car that inspired him and son Robby to build the current versions. The Taylor car guy legacy lives on.

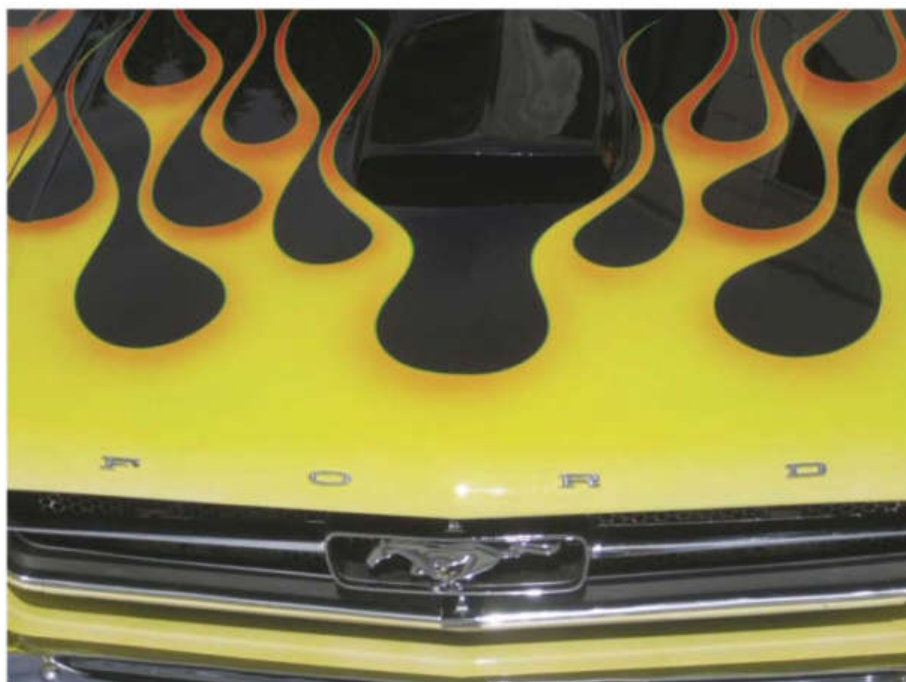


With all of the mechanicals completed, Rob and Robby prepped the body for paint. Two-stage PPG Black was carefully applied. Next, Rob did what he does best, the custom treatment. Nothing looks better on black than hot rod flames. White to yellow to red licks were laid and sprayed. The entire car was cut and buffed. The final saber brushwork was added to finish the exterior effects.

In the end, One Trick Pony created the inspiration for One Hot Pony. The latest Mustang in the Taylor corral may not have the street-racing prowess of its cohort from the past, but it's more

drivable. And drive it does. Robby is a regular at local cruise nights and show and shine events. The son now follows in his father's footsteps.

The circle has been completed; the car guy gene successfully passed from one generation to the next. This is exactly what the automotive enthusiast scene needs in order to survive. In the decades to come, perhaps it will be Robby who has the opportunity to offer the same muscle car passion to his children. But, one word of advice: Robby, don't sell your Mustang. Keep it, build one with you son and cruise side by side. **MD**



■ A Shelby GT-350 hood with functional scoop replaced the factory flat sheet metal. Note how the right-side and left-side flames mirror each other—not an easy task. Rob also made a bold choice in striping the licks bright green.



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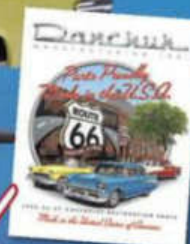
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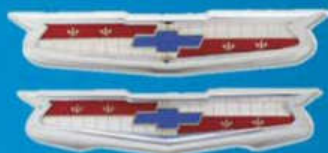
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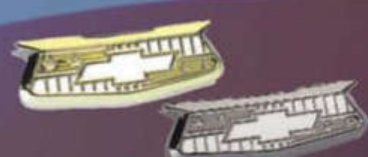
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# BAD TO THE CHROME II

When Richard Rawlings Gets a Free Car,  
he Knows how to Turn it Into Gold

■ TEXT AND PHOTOS BY KEVIN WHIPPS





**Unless you've been living** under a rock for the past five years, you've heard of Gas Monkey Garage, and its eccentric owner, Richard Rawlings. Even if you haven't seen his hit Discovery Channel television show "Fast & Loud," you've probably seen Richard in commercials for Dodge and its lineup of powerful cars. His "Dodge Law" shorts have tons of hits on YouTube, so chances are you've stumbled across them at one time or another. Point is, you should know Richard Rawlings and Gas Monkey Garage, and if you don't, this might be a good time to do some research on your ol' Google machine.







WE ASSUME THAT **HE DROVE THE CAR ONLY DOING THE LEGAL SPEED LIMIT AND NEVER ONCE DID A BURNOUT THAT FRIED THE TIRES OFF**, BECAUSE WE'VE SEEN HIS TV SHOW AND WE KNOW THAT'S NEVER HAPPENED—OR MAYBE THAT WAS ANOTHER SHOW—EITHER WAY, IT WAS A FUN CAR TO CRUISE.

### Stalwart Beginnings

Since Rawlings and Dodge are tight, Dodge gave him a preproduction '15 Dodge Charger R/T Scat Pack even before the models showed up at dealerships. We assume that he drove the car only doing the legal speed limit and never once did a burnout that fried the tires off, because we've seen his TV show and we know that's never happened—or maybe that was another show—either way, it was a fun car to cruise. But, because it was a preproduction model, it had no VIN. Therefore, there was no way to register the thing, and it was, more or less, a cool thing to drive semi-legally before it found its way to the OE crusher.

Rawlings is an enterprising man. He's built up a small empire of his own, between Gas Monkey Garage and his various other ventures, and he knows how to move cars. But





he couldn't really sell the '15 Scat Pack, and he couldn't drive it daily. So what was the next best option?

Flashback a few months prior when Rawlings picked up a '71 Challenger at an auction (one of many he attends every year). The car was previously an attempt at a Concours restoration. It was in great shape, with excellent paint and bodywork. It was slated to undergo a mild restoration at the Gas Monkey shop before being sold to make some cash. That was the plan, anyway.

Things got in the way, as they tend to do. The '71 was scheduled behind a few other rides before it went under the knife. That meant Rawlings and the guys had some time to start asking questions, the kind that make you want to ditch the original build concept and go with something different.

That's when the decision was made to take the motor out of the '15 R/T Scat Pack and swap it into the vintage Challenger. It was a plan that was just crazy enough to work.

### The Build

Since the exterior was already in great shape, the focus of the Challenger build was almost entirely on the engine and suspension. To start, they went to Magnum Force Suspension to source every component they needed for the build. They went with a new k-member up front and a parallel 4-link out back, with Viking coil-overs all the way around.

What's great about the k-member kit is that they were able to get custom mounts built in for the motor, plus they sourced a Magnum Force

■ **TOP:** The classic Pistol Grip shifter got a tasteful makeover adding a fresh twist to an iconic American muscle image.

■ **MIDDLE:** The temptation to mess with a good thing was suppressed because the factory R/T hood in Sassy Grass Green with black stripes still turns heads.





## '71 DODGE CHALLENGER

**Owner:** Havoline  
Louisville, KY  
**Builder:** Gas Monkey  
Garage  
Dallas, TX

### CHASSIS (FRONT):

- Magnum Force suspension k-member
- Magnum Force Suspension upper control arms, lower control arms, coil-overs
- Magnum Force Suspension rack-and-pinion
- Viking Performance coil-overs
- Magnum Force Suspension sway bars

### CHASSIS (REAR):

- Magnum Force ProLink rear suspension
- Dana 60 rearend axle housing
- Strange 3:73 gear ratio
- Eaton Detroit Truetrac
- Viking Performance coil-overs
- Magnum Force Suspension sway bars

### BRAKES:

- Wilwood front disc brakes
- Wilwood six-piston aluminum calipers
- 14-inch, ball-milled and vented rotors
- Wilwood rear disc brakes
- Wilwood four-piston, aluminum calipers
- 14-inch, ball-milled and vented rotors
- Wilwood dual master cylinder

### WHEELS:

- U.S. Mags RestoMod 'Cuda U438, forged aluminum O.E. replicas
- Front 18x8 (5-inch backspacing)
- Rear 20x10 (6-inch backspacing)

### TIRES:

- Toyo Proxes 4 Plus 235/40 18 front
- Toyo Proxes 4 Plus 295/30 20 rear

### ENGINE:

- 6.4L 392 Hemi from a 2015 Dodge Charger R/T Scat Pack
- All fabrication by Gas Monkey Garage
- Stock Mopar engine block, bore and stroke, crankshaft, connecting rods, pistons, camshaft, valvetrain, cylinder heads, valve covers, intake manifold, induction system, air filters and ignition

- TTI long tube headers
- Magnaflow catalytic converters, Magnaflow resonators, 3-inch tubing, stock Mopar exhaust tips
- Magnaflow mufflers
- Custom-built Ron Davis Racing radiator
- SPAL dual electric cooling fans
- Stock Mopar water pump, pulley assembly, alternator and starter
- Stock fuel tank with Aeromotive 340 fuel pump
- Engine builder: Gas Monkey Garage

### TRANSMISSION:

- Dodge Viper T56 transmission
- American Powertrain clutch
- Bell housing adapted a Viper T-56 to a Dodge T-9
- American Powertrain short throw shifter
- Strange Dana 60 rearend with 3:73 rear gears
- Inland Trucking Supply drive shaft

### BODY:

- Dodge E-Body
- Stock Mopar body panels, hood, hood hinges, front fenders, grille, front bumper, door skins, floor pans, floor pan coatings, roof, rear quarter panels, exhaust port heat shields, trunk lid, bumper, and rear taillight bezels and lenses
- Clear headlight swap
- Digi-Tail 1971 Challenger digital taillight panels
- Mini-tubs in rear

### PAINT:

- Dodge Sassy Grass Green with Mopar R/T stripes

### INTERIOR:

- Stock Mopar dash, steering wheel, clutch and brake pedal assembly, brake master cylinder and restraints
- Classic Instrument gauges
- 2015 Dodge Charger R/T Scat Pack throttle pedal
- Gas Monkey custom-machined pistol grip handle with carbon fiber
- 2015 Dodge Charger R/T Scat Pack air conditioning adapted to 1971 Challenger
- Additional foam for seat support added by Gas Monkey Garage; reupholstered by Sue at ASM Auto Upholstery
- Carbon fiber dash and panel inserts

SPECS



Suspension transmission cross member as well to work with the T-56 transmission from a Dodge Viper. This also gave them power rack-and-pinion, so between all of the upgrades, they were in great shape. The car now rode and handled like a modern day muscle car, but still had the classic looks.

Now about that engine, it's a 6.4L, 392 Mopar pulled straight out of Rawlings' '15 preproduction model Charger

R/T Scat Pack. With the help of the Magnum Force Suspension k-member, it bolted right up. The aforementioned Dodge Viper T-56 tranny was mated to the motor with an adapter, and then the gas pedal was installed so that they could control the electric throttle body. Nothing's been done to the engine internally, other than the TTI long tube headers and a custom Magnaflow exhaust, it's as stock as it gets. Now that said, stock

■ From a quick glance, this looks like a mildly upgraded '71 Challenger. However, under the vintage skin are modern suspension and driveline components.





■ A Scat Pack 392 Hemi was lifted out of a '15 Charger and transplanted in place of the old 340 engine. The 485 horses are backed up with a T-56 tranny from a Viper.



still means 485 hp and 475 ft-lb of torque, so it's certainly no slouch, even under all of that heavy metal.

The finishing touches on the car were a set of 18x8 wheels up front and 20x10s out back. They're the U.S. Mags RestoMod 'Cuda U438, but before they had that fancy name, they were just an idea in Rawlings' head. He wanted some big rollers that looked just like the factory models, and he turned to U.S. Mags (an MHT company) to make it happen.





The end result is a car that offers the same great lines as it always did, but with better handling, a lower stance and a strong, reliable motor.

### A New Player Enters the Game

Now that the car was done, everything was going strong. It was a good-looking car, it's gotten a ton of attention and it would probably fetch Rawlings and his shop a good price. Then in comes the buyer, money changes hands and everything is golden. Oh, and that buyer? Havoline. Yes, that Havoline.

Their plan is to give away the car at the AAPEX convention during SEMA week. Contestants

■ The old leaf springs were replaced with a parallel 4-link using Viking coil-over springs. This naturally improved the ride and handling capabilities far beyond what was originally engineered in 1971.

can visit the Bad to the Chrome II Facebook page and enter to have a chance to win the '71 in all its glory. Entries must be received by Oct. 16, 2015.

This means that soon the '71 will have a new home, and someone other than Rawlings and his team will be able to lay fat tracks down the road. Or maybe Rawlings will teach the new owner how to do it the right way, or not, who knows. Either way, someone is going to get very lucky soon, and we're more than a bit jealous. **MD**





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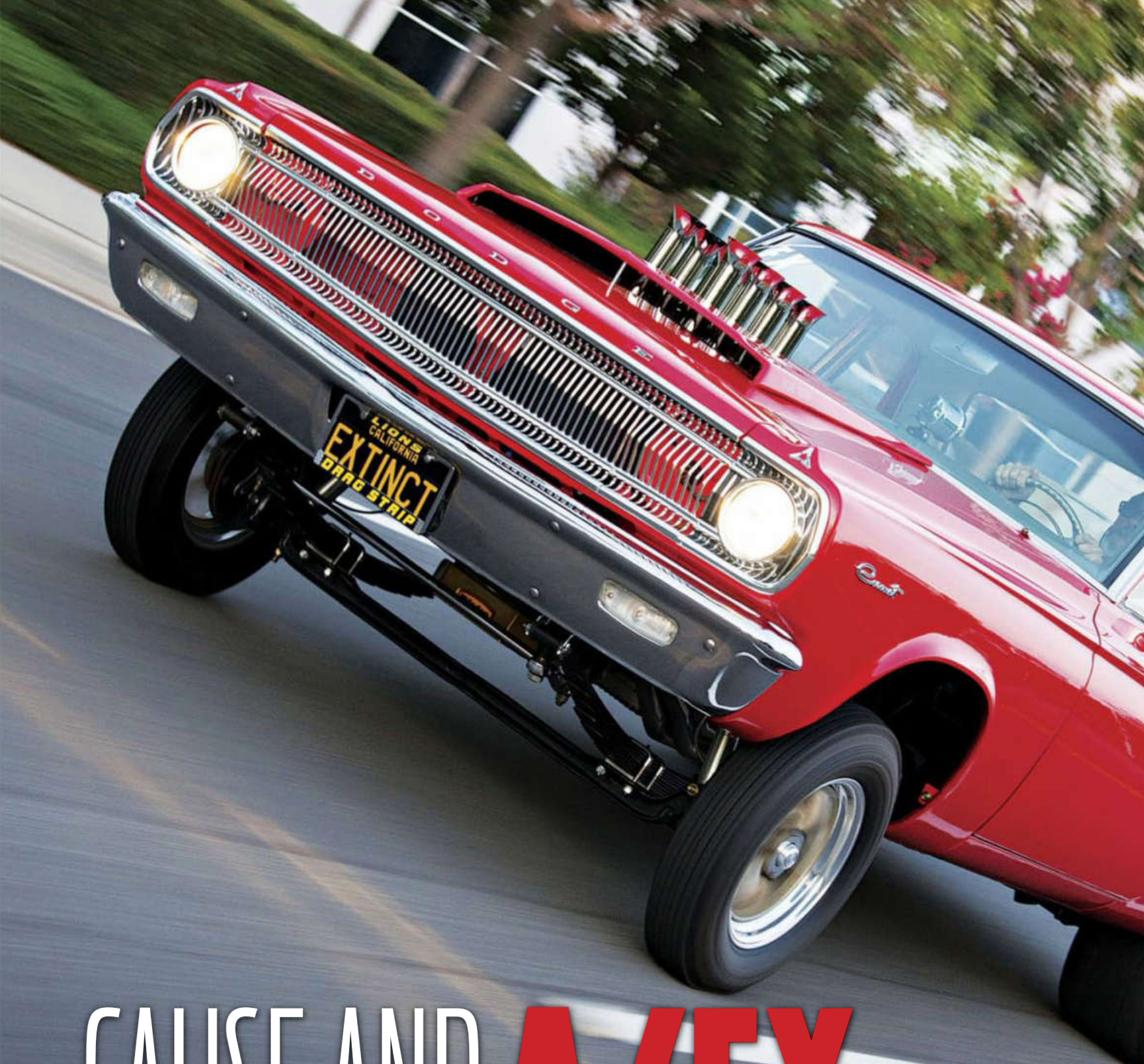
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# CAUSE AND **A/FX**

The Return of the Hetrick Dodge

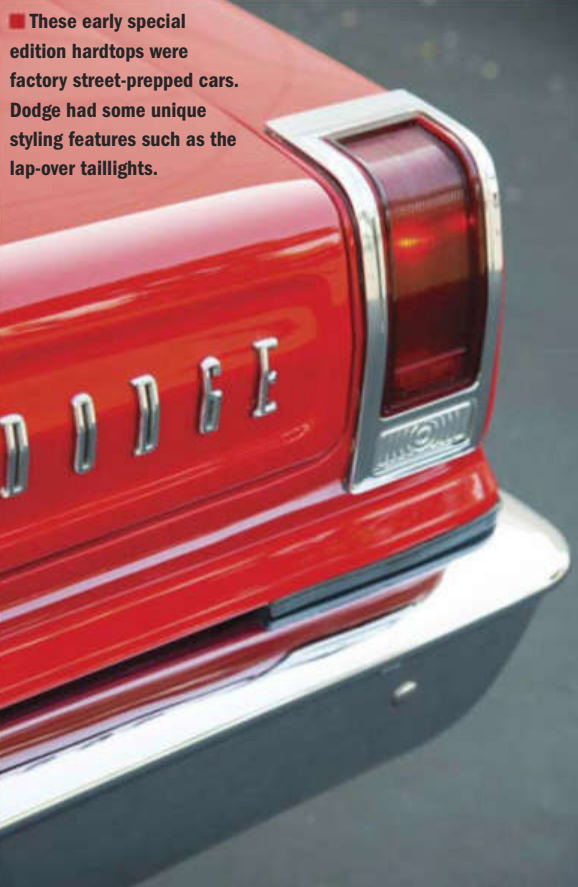
TEXT BY LOU LETO ■ PHOTOS BY GUY SPANGENBERG





■ Mickey Thompson drag radials house American Racing wheels. Note the long studs and center cap delete.

Many of today's drag racing fans may not know that the '60s was an era where advancements in speed and equipment moved quickly in an extremely short period of time, often with dramatic and unpredictable results. There was a major shift from "once was" to "what soon would be." Beginning in the late-'50s, the Gasser wars were a significant part of the show. Fat-fendered Fords, Chevys and Willys did battle with Anglia and Thames creations. They were called Gassers and came in every trial-and-error configuration that could be dreamed up. Powered by supercharged or injected big-inch Oldsmobile, Caddy, Chevy and early Chrysler Hemi engines, these were the dominant crowd pleasers.



■ These early special edition hardtops were factory street-prepped cars. Dodge had some unique styling features such as the lap-over taillights.





Loyal fan bases were formed following the antics and victories of Stone Woods & Cook, "Big" John Mazmanian, the Kohler Bros., Ohio George Montgomery, K.S. Pitman, Junior Thompson and many more. So popular and notable were these teams that they often secured equal sponsorships and billing as the Top Fuel drivers of the day. These wild machines drew crowds, and track promoters from around the country seized the moment and booked pairs of Gassers for organized match race appearances.

Another class that had a strong following was Fuel Altered. These cars were popular due to their over-powered, short wheelbase, big cubic inch combinations with exposed drivers making eye-watering, ear-shattering, ill-handling and sometimes ill-fated runs.

However, during the '60s, change was in the wind and a dramatic, significant advancement would soon all but push the Gassers and Altered into the deep shadows.

Major automobile manufacturers studied potential buyer demographics and noticed the rapidly growing attendance at stock car and drag racing events. The manufacturers' racing band that



IN 1965, THE MANAGEMENT  
AT VARIOUS AUTO  
FACILITIES **WAS IN A NO-  
HOLDS BARRED  
FRENZY** THAT INCLUDED  
ENCOURAGING AND  
FUNDING ENGINEERING AND  
EXPERIMENTATION.

had existed since the late-'50s (but none truly kept to) was broken. By 1963, the Big 3 were heavily involved in the development of competitive vehicles for the strip. The marketing folks adopted the philosophy of "what wins on Sunday sells on Monday" and eagerly touted the victories of race teams with back door, factory-sponsored relationships. They encouraged the production and support of higher horsepower engines, stuffing them into lightweight street models, similar to those offered for sale through Main Street dealers.

Vehicles that looked like those on the track were selling like hotcakes off showroom floors. Ford 390s became 406s that grew to 427s. Chevrolet, already with a legendary 409 (an expanded 348), developed a mystery 427. Pontiac had versions of a 421 all the way up to a full-race Super Duty. Dodge and Plymouth engines, some already with unique Ram-tuned manifolds, quickly enlarged from 361 to 413 to 426 cubic inches. Then hemispherical cylinder heads were updated from their effective '50s design and were bolted on the 426 block. The amount of offerings from all of the OEMs as well as the aftermarket quickly grew, and rapid parts development created valve train and

■ A thing of beauty resides under the hood, a 528-cid Hemi engine topped with Hilborn injections. The compression ratio was lifted to 10:1. TTI headers handle the after burn, while MSD throws the spark.







multi-carburetion combinations that could be bought over the counter in the dealer parts department and speed shops even before the next vehicle models came out.

Meanwhile, back at the drag strips, brand-new vehicles were filling the fields, some appearing with sponsorship from local car dealers. Brand loyalty was being built, with legions of fans coming out to cheer for the make of their choice, be it Ford, Mercury, Chevy, Pontiac or the mighty Mopars from Dodge or Plymouth. Tech articles and new vehicle tests by the enthusiast magazines were spreading the gospel to their readerships, many that were now armed with this information and going to their dealers to special-order vehicles or buy updated parts.

In 1965, the management at the various automobile factories was in a virtual no-holds barred frenzy that included encouraging and funding engineering and

experimentation with large budgets all targeted to beat their competitors at the track and in the dealer showrooms across America. An assortment of stock classes was where all of the emphasis lay, since the race cars looked like the makes and models the general population could buy. The dealers got involved to compete in some of the lower classes of A through H stock, depending on the weight and horsepower combinations, to dominate brand victories. Super Stock (S/S) was the most popular class in drag racing and became the major battlefield for the big-inch engine offerings. Though the cars were the stars, the drivers, many now with factory funding assistance, became known names with significant fan followings. Some had been recruited away from earlier allegiances, examples include: "Dino" Don Nicholson, who moved from Chevy to Mercury; Butch Leal, who bolted from a Ford Thunderbolt to Plymouth; Sox and Martin, who moved from Mercury to Plymouth, and Dick Landy, seen earlier piloting a Plymouth, stayed in a Mopar, but ultimately went to a dandy Dodge.

In 1965, Super Stock drag race vehicles quickly evolved, so quickly that '65 is still recognized as having the most significant changes in a one-year period. Manufacturers were rapidly creating new iterations within that model year and continually lobbying the largest sanctioning drag racing organizations for concessions. While the National

■ The interior has the basic needs, and the Champaign Gold is period correct. Note the low-back bucket seats and their perches. Gotta love the crank windows.

■ The rear is a Dana 60 fitted with Sure Grip axles and 3.56:1 street gears.

Hot Rod Association (NHRA) was the largest group, there were other sanctioning bodies with their own member tracks. Factories were developing unique and more powerful limited edition parts and versions of their vehicles that they wanted to be approved. The pressures on the competing sanctioning organizations were great; if they did not approve, then the manufacturers simply encouraged their factory-sponsored teams to avoid the sanctioned tracks that did not approve and race at other venues.

The first development phase of special cars in 1965 included acid-dipped bodies, equipped with smaller, lighter bucket seats that replaced front bench seats; special fiberglass or aluminum front fenders, hoods and bumpers were developed, along with thinner side glass, all to save weight. Vehicles equipped with these items were still stock in appearance to fans and still were using carburetor-equipped engines.







The next phase of Dodge and Plymouth development were the “2% cars.” There were a handful of factory vehicles that had front axles moved 2% off the wheelbase forward, a bit over 2 inches. Some used dropped axles originally located under the little Dodge A100 vans. The changes to the 2% cars were approved by NHRA, along with 10-inch-wide rear drag slicks, was all about trying to obtain an effective weight transfer, to shift more weight emphasis during the launch to the rear wheels for added traction advantage. While barely perceptible to the fans, these vehicles were relegated to a new classification known as Factory Experimental, or FX. The vehicles with the largest engines became A/FX, with smaller engines in B/FX. The fuel delivery quickly was converted from carburetors to a Hilborn fuel-injection system equipped with tall stacks sticking out of the hood.

A bit later in the same 1965 season, Dodge/Plymouth factories developed 12 special vehicles with severely altered wheelbases, the rear wheels moved up 15 inches, and the front wheels moved forward 10 inches. They were an immediate hit with ticket-buying fans. These morphed, wild-looking cars also toured the country in crowd-pleasing match racing events. Independent racers started radically modifying their privately

■ **Blacksmith technology was in use back in the good ol' days before Funny Car drag racing. A drop-style straight axle on leaf springs got the front end up to help keep weight transference to the rear of the car during launch.**



owned vehicles, some directly copying the look of the factory altered wheelbase (AWB) vehicles; others were just crude interpretations that looked odd. Probably more than one track announcer described these as “funny-looking” cars. From these humble beginnings, this trend of radically changed stock vehicles paved the way towards continued extensive modification and development that became what is now commonly referred to as Funny Cars.

Jim Hetrick was a die-hard drag racing fan, attending many of the events back in the day. Hearing him describe the evolution of Super Stock into FX cars, with their accompanying match-race madness, is a distinct learning experience since he's more passionate talking about Mopar-powered vehicles than any other topic. Rather than hemoglobin running through his veins, he must have “Hemi-globin.” He describes seeing Dick Landy's Dodge, with the tall



Hilborn stacks poking through the hood, and admits it made a lasting impression.

Fast forward to modern times. While Jim has stayed brand loyal, with an original Hemi Road Runner and a Hemi Dart, he missed owning the one that made the most significant impression. On the search for a proper car, he found an A990 tribute. “Only 101 Dodge A990’s race-Hemi-powered, lightweight, purpose-built drag race cars were built by the factory in 1965. As Jim related, “All were post cars [two-door sedans] that had Champagne interiors. The Dodge A990 tribute that I found five years ago was fairly correct, powered by a near stock-looking but larger 528-cubic inch Hemi crate motor, with 10:1 compression, TTI headers and a big cam. It sounded strong! The personal touches by the owner included a red interior, the wrong cross-ram intake manifold, a floor-mounted shifter in place of the automatic, and the wrong steering column. I had been searching for a car for six months. This one was a good starting point, but I wanted to make mine period-correct accurate.”

Surrounding himself with like-minded, talented, Mopar-fanatic friends, he enlisted the



■ The trunk is as it should be with an aluminum fuel cell and old-school battery relocated to the rear.

## IT BRINGS BACK MEMORIES OF A BRIEF MOMENT IN DRAG RACING AT THE INFLUENTIAL BEGINNING STAGES OF WHAT HAS BECOME THE POPULAR, LONG RUNNING NHRA FUNNY CAR CLASS.

services of Brian Dickey of Dickey’s Hot Rod Shop in San Clemente, California to seek out and install a Gary Ball interior in the proper Champagne hue. “Brian also pulled the dash out, painted it Champagne, and installed the correct steering column equipped with a column shifter,” Jim told us.

Within two months after purchase, Jim put the Hemi on a carb-free diet and installed a Hilborn fuel-injection system. “It’s an EFI system suitable for street use,” he says. “I wanted the 13-inch-tall stacks sticking out above the hood scoop that had been cut away, just like in ’65. The stacks were custom-built from aluminum tube stock supplied by Hilborn. I even made certain that it has the proper black stripes near the top. Those stripes back then were actually electrical tape, the look is also period-correct. As the factory teams were experimenting with tunable stacks of various lengths, they discovered that the longer/taller tubes offered more torque. The bells at the top of the stacks were affixed with the black tape.”

The most dramatic change was to the front suspension. All of the stock components were removed and replaced with a dropped front axle from a Dodge A100 van, just as had been done in 1965. Jim credits Dale Snokes and his shop, The Metal Shed of Pomona, California, for the correct conversion. The rear was mini-tubbed. “Dale took one week,” Jim told us. The rest of the suspension, engineered for street use, is equipped with QA1

shocks with factory-style Super Stock leaf springs at the rear, along with a pinion snubber on the 3.54 with Sure Grip-equipped Dana 60 rear axle.

The Torch Red (a modern Corvette color) Dodge rolls on American Racing wheels: 10 inches wide on the rear, strapped with M/T Drag radials sized 315x50x15. Fronts are 4.5-inch widths, with era-correct BF Goodrich Silvertown tires in the proper 6.40x15 configuration.

Jim has driven his Dodge often. “With a FAST self-tuning box installed last October, it’s now a much better-driving car. It’s been to many car shows and gatherings, winning awards at the John Force monthly show, the Cruise for a Cure and the Labor Day Show at Orange County Fairgrounds. It was featured in the Hot Rod Junction during an NHRA race in Pomona. While at the Triple A Show, Funny Car legend Tom “the Mongoose” McEwen came by and signed the car,” Jim proudly states. “The car is best appreciated by folks today that know the significance this type of car contributed during that era.”

It’s hard to believe that 50 years have passed since this experimental version from Dodge was an FX that was a popular track teaser and crowd pleaser. It brings back memories of a brief moment in drag racing that was at the influential beginning stages of what has become the popular, long running NHRA Funny Car class. If he could, the late Dodge legend Dick Landy would probably still admit: It’s a dandy. **MD**



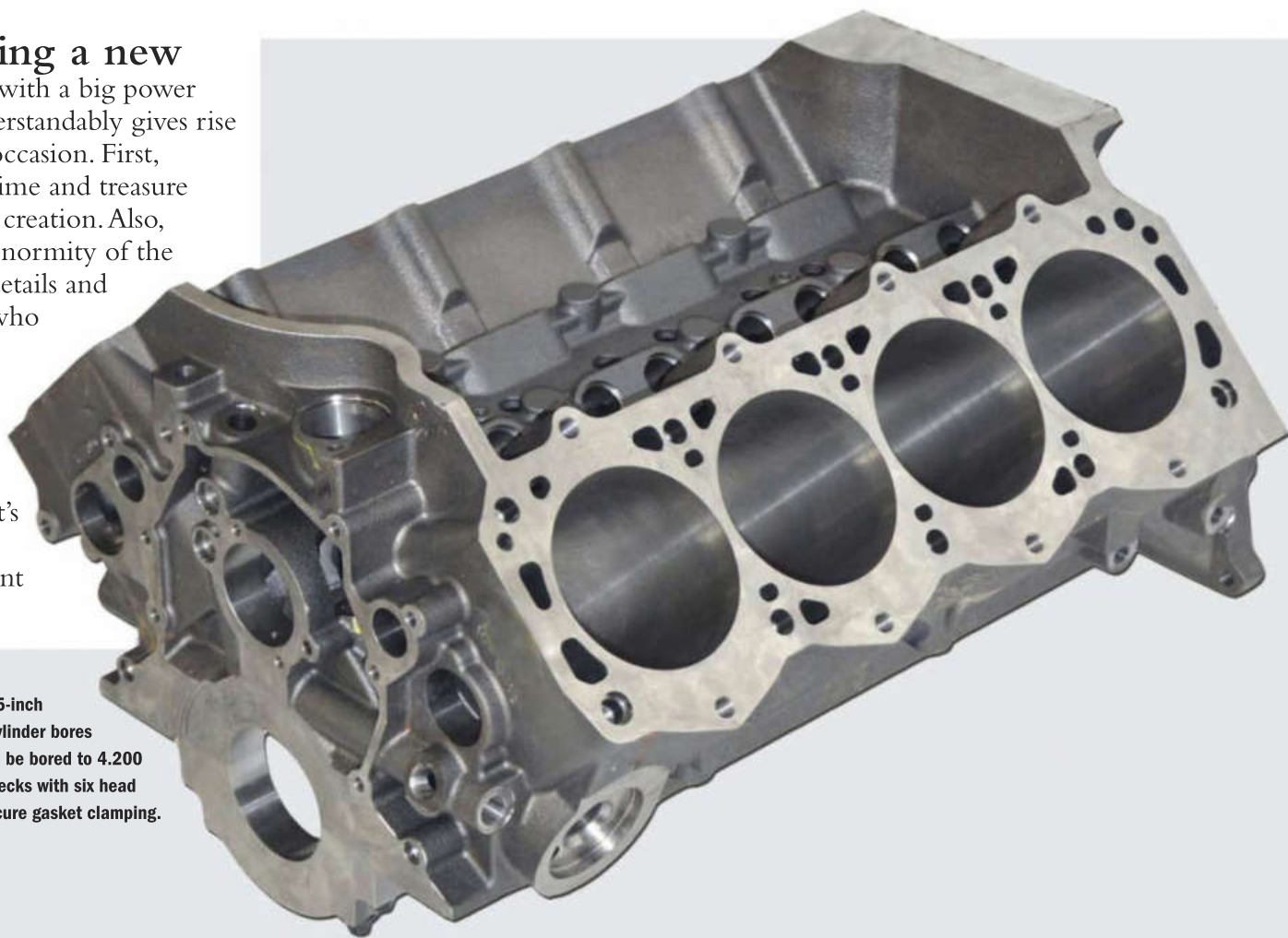
# New 454-ci “FORD” Engine Block

World Products  
Launches Formidable  
Windsor-style Competitor

BY ALFIE BILK ■ PHOTOS BY MOORE GOOD INK

Introducing a new engine block with a big power potential understandably gives rise to a sense of occasion. First, consider the time and treasure invested in its creation. Also, consider the enormity of the engineering details and the designer who tirelessly examined hundreds of complex regions of the new casting. It's an endeavor not for the faint of heart.

■ Both 8.2-inch and 9.5-inch blocks adopt Siamese cylinder bores with thick walls that can be bored to 4.200 inches and extra thick decks with six head bolts per cylinder for secure gasket clamping.





THE 9.5 VERSION DISPLAYED IN FINISHED FORM SPORTED A DISPLACEMENT OF 454 CI (7.4L), EXHIBITED A HOST OF ADVANTAGES AND ECHOED THE BIGGEST ENGINE NEWS OF THE SHOW. IT'S CALLED MAN O' WAR.







■ Both engine blocks are substantially upgraded, using 40,000-psi cast iron alloy. They also feature thicker main webs and longer cylinder barrels that extend into the crankcase by 0.500 inch. These present better piston support with long-stroke crankshafts.

But its culmination is exactly what we observed at the end of 2014 when, during the PRI exhibition in Indianapolis, World Products unveiled two innovative Ford-based blocks. Both defined as small-blocks, they are distinguished mainly by their deck heights: one measures 8.2 inches, the other 9.5 inches.

The 9.5 version displayed in finished form sported a displacement of 454 ci (7.4L), exhibited a host of advantages and echoed the biggest engine news of the show. It's called Man O' War.

The Man O' War block had existed previously, but when World Products was sold in late 2012 the new owners decided to entirely revise it. Now

DEVOTED TO THE IDEA THAT THE NEW ENGINE SHOULD BE THE STRONGEST AND MOST RUGGED, **BOYER, AN ACCOMPLISHED RACE ENGINE BUILDER AND TUNER, CAST THE NEW POWER UNIT IN 40,000-PSI IRON ALLOY.**

graced by new architecture and the brainchild of World's Engineering Director, Dick Boyer, it accommodates the original 10-bolt cylinder heads as well as the latest aftermarket high-performance 18-bolt counterparts. Introducing six head bolts per cylinder combined with extra thick decks greatly reinforces gasket clamping, but its sporting credentials didn't end there.

Devoted to the idea that the new engine should be the strongest and most rugged, Boyer, an accomplished race engine builder and tuner, cast the new power unit in 40,000-psi iron alloy. He also increased the thickness of the main bearing webs, upgrading the front one by adding 0.080 inch and the center three by 0.030 inch. To increase the main web structure further, the traditional ½-inch main cap fasteners were revised to ⅝ inch, leaving more material in the webs.

A replacement for both Ford's 302 and the ubiquitous Windsor motor, World's new block is available in two deck heights, 8.200 inches and 9.500 inches respectively. Deck heights have a direct bearing on the engine's capacity. Shorter



deck heights limit the stroke length and the engine's cubic inch displacement.

The 8.200-inch block is a direct replacement for 5.0L Mustangs and is compatible with OEM heads and exhaust systems. The 9.500-inch block works with all 351 Windsor-style components. Both employ Siamese cylinder bores with thick walls, which can be bored to 4.200 inches.

Much to the blocks' credit, the bottoms of the cylinder barrels are extended down into the crankcase by 0.500 inch. This approach introduces superior piston support while operating with long-stroke crankshafts. In the case of the 8.200-inch deck blocks, clearance is provided for a 3.500-inch stroke crank while the 9.500-inch deck blocks accommodate a 4.250-inch stroke crank.

Either billet steel or nodular iron main caps are fitted. Featuring a splayed four-bolt stepped and doweled register, they incorporate ARP fasteners (bolts are used with the nodular caps, studs with



■ ABOVE. Designer Dick Boyer with the latest Ford-based Man O' War engine; it's equipped with priority mains oiling for reliable lubrication at high rpm. It also features larger diameter oil galleries to reduce restrictions.

■ BELOW. The 8.2-inch deck block has clearance for a 3.500-inch stroke crank and the 9.5-inch block for a 4.250-inch crank. Billet steel or nodular iron main caps are provided. These feature a splayed four-bolt layout with dowels, stepped registers and ARP fasteners.





■ Boyer not only ensured the engine would accommodate many off-the-shelf parts, but also made it available as a complete package.



the billet caps). In addition, priority mains oiling system is featured, which delivers oil to the main bearings first, ensuring reliable lubrication at high rpm. To further improve main bearing lubrication prospects, the inadequacy of restrictive oil flow was overcome by enlarging the diameter of the main oil gallery and also the passage from the oil filter to the main gallery.

Perhaps Boyer's real stroke of genius lies not only in combining a 4.125-inch bore with a 4.250-inch stroke, ensuring the engine would accommodate many off-the-shelf parts, but also in making it available as a complete package, if desired.

An entire kit of compatible components engineered, tested and proven simplifies construction, shortens build time and suppresses rising costs. Pushrods, for example, are supplied to the exact length and specification, and so is everything else.

Introduced in 1962 by Ford as its engine replacement for the Y-block, the rated power and torque values of the early Windsor were stated as 145 hp at 4,400 rpm and 216 lb-ft at 2,200 rpm. As it evolved during the next 40 years, it arguably became Ford's most successful competition engine. Now revitalized for 2015 in 454-ci configuration, Boyer has brought a fresh engineering

richness to the concept. By combining the new block with World's standard kit of parts, he generated 735 hp during preliminary tests.

Finally, the blocks are semi-finished to 0.005 inch under size to accommodate 4-inch and 4.125-inch piston and ring packs. Part numbers and details are as follows:

- 087010 - 8.200" deck, 3.995" bore, Nodular 4-bolt caps
- 087020 - 8.200" deck, 4.120" bore, Nodular 4-bolt caps
- 087072 - 9.500" deck, 3.995" bore, Nodular 4-bolt caps
- 087082 - 9.500" deck, 4.120" bore, Nodular 4-bolt caps
- 087110 - 8.200" deck, 3.995" bore, Billet 4-bolt caps
- 087120 - 8.200" deck, 4.120" bore, Billet 4-bolt caps
- 087172 - 9.500" deck, 3.995" bore, Billet 4-bolt caps
- 087182 - 9.500" deck, 4.120" bore, Billet 4-bolt caps

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75-79 Nova	65-67 GTO / LeMans
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65-66 Impala	71-72 GTO / LeMans
67-68 Camaro	68-69 Cutlass / Skylark
1969 Camaro	70-72 Cutlass / 70 Skylark
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# Building a Better SQUEEZE BOX

## Supercharging for the Street

■ TEXT AND PHOTOS BY ALAN PARADISE

■ Huge GMC 671 blowers look intimidating and can make massive horsepower with ridiculous boost, but for the most part they're not as practical for the street as they are on the track. How ironic that the animated effect works on this specially built Camaro ZL1 as a prop for the movie *Turbo* as a turbocharger is a completely different type of forced induction.





**Forced induction** using a supercharger is not a new concept. In fact, superchargers have been used on production-based cars since the '30s. However, to performance geeks, superchargers are often referred to as “blowers.” That brings to mind the massive GMC 6-71 or 8-71 ribbed boxes atop the engines of Top Fuel dragsters and Funny Cars. There is also the image of the same type of detuned and polished units on mega-buck street rods or protruding out of the hoods of Pro Street cars; you know the ones, built to impress and intimidate.

For street use, the over-the-top, race-ready units are neither useful nor practical. On the street, for every day (or at least once a week) properly engineered and installed units have the ability to deliver reliable performance without compromising engine durability. This has become evident by the recent presence of factory-installed superchargers on “showroom” models offered by not one, but all three domestic makers: Ford, GM and Chrysler.

Mustang, Camaro, Challenger, Charger and Corvette as well as selected Cadillac models are available with superchargers. What has made this possible is the development of modern technology to deliver major punch in smaller capacity units. This has made reasonable and manageable power while offering very little risk.

The application of choice is no longer just the classic Roots configuration supercharger. Centrifugal and twin-screw superchargers are also a part of the new car and aftermarket scene. The differences between these configurations are dramatic in both packaging and performance, and the choices can seem overwhelming. Before the differences can be appreciated, however, some basic explanations and definitions are in order.

### **What a Supercharger Does**

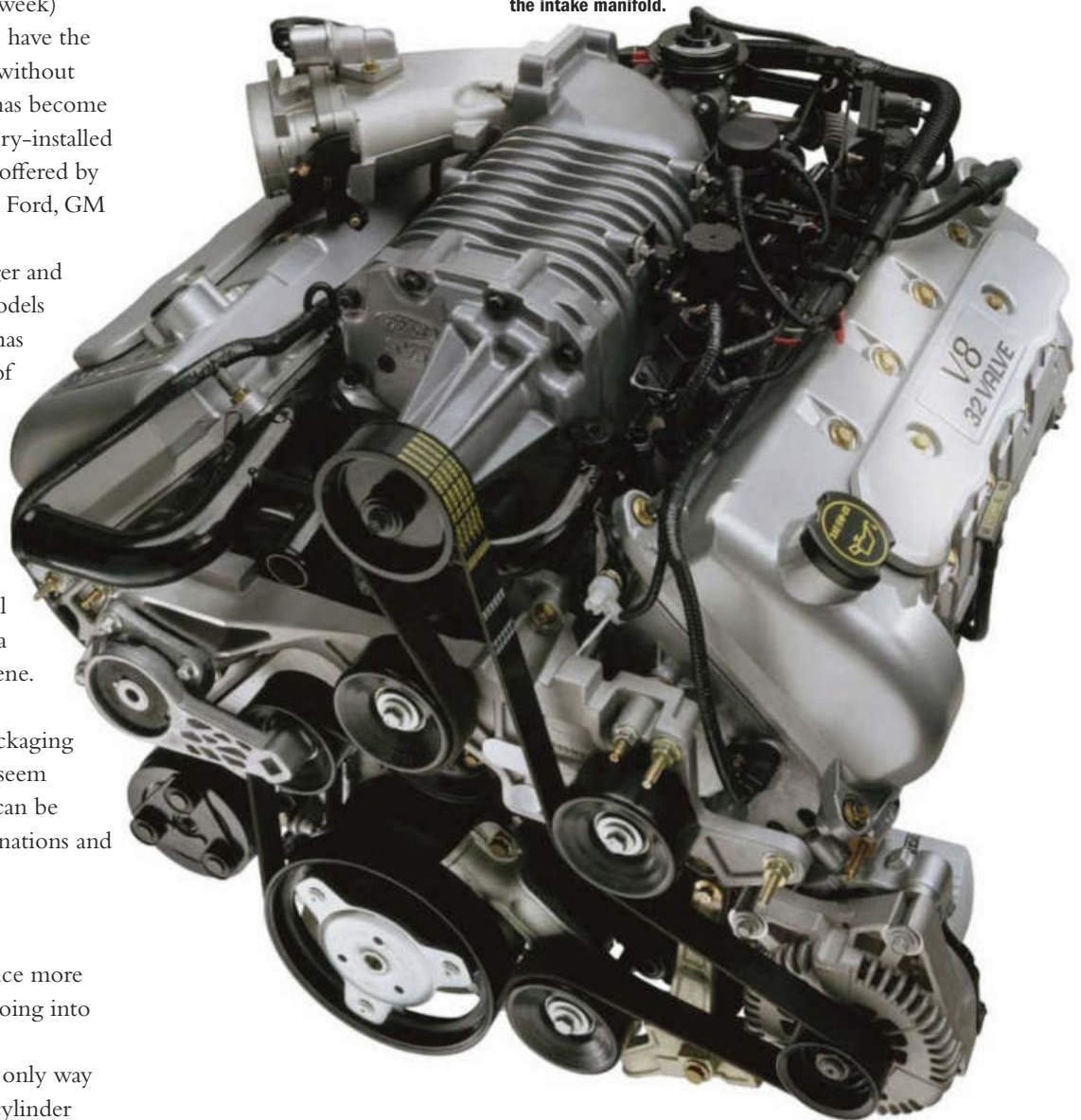
A supercharger helps the engine produce more power by compressing the air charge going into the combustion chamber. Because the displacement of an engine is fixed, the only way to get more air/fuel mixture into the cylinder

**THE SUPERCHARGER IS  
ACTUALLY NOTHING  
MORE THAN A GLORIFIED  
AIR COMPRESSOR. THERE  
IS, HOWEVER, NO  
CORRELATION BETWEEN A  
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IN YOUR GARAGE.**

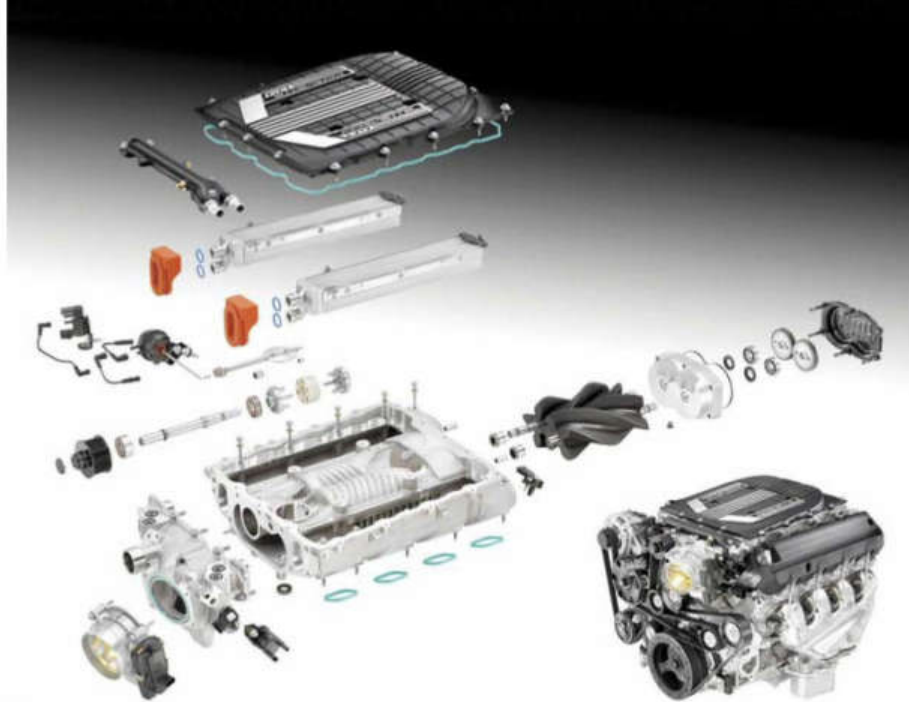
space is to compress it and force it in place. The supercharger is actually nothing more than a glorified air compressor. There is, however, no correlation between a supercharger and an air compressor you might have in your garage.

The supercharger only helps with power increases because compressed air alone does not produce power. Fuel is where the energy is stored and, efficiency being equal, the only way to get more power is to burn more fuel. A higher air density in the combustion chamber allows this to happen.

■ For more than a decade Ford has been using Roots-style superchargers on its SVT Mustang, Lightning and GT models. Note how the air inlet feeds the rear of the supercharger. Air is forced forward to the front of the casing and thrust down into the intake manifold.







■ An exploded view of the twin-screw blower on the Corvette Z06. The compressed design allows the new LT-4 engine to be just a single inch taller than the previous LT-1 engine. The four-lobed rotors can spin in excess of 20,000 rpm, helping to produce results on the top end as well as provide grunt on the low end.

### What a Supercharger Doesn't Do

There is a good deal of misconception regarding supercharged engines. The most horrific is the belief that a supercharger can fatally damage an engine. This, for the most part, is not fact. First, let us assume some parameters: a healthy engine, reasonable amounts of boost, correct fuel and ignition management and proper installation. That might seem like a great deal of assumptions; however, on all factory-installed applications these aren't assumptions at all. Also, aftermarket kits, especially those engineered and offered throughout the past 10 years, have highly effective safeguards. With these parameters in place, there is no reason a supercharged engine should suffer any premature damage. The load a supercharger creates on the engine's internal components is not increased significantly enough to cause

catastrophic failure. In fact, in many engines, the highest loads are seen when the piston reaches top dead center (TDC) and the connecting rod is under tension. In this instance, the supercharger has the effect of actually reducing load as the pressurized air in the combustion chamber acts counter to the load generated by the decelerating piston.

There can be problems, however, if detonation is allowed to occur. Detonation, simply put, is caused when the octane rating of the fuel affects the ability of the unburnt end gases

to resist spontaneous auto-ignition. If auto-ignition occurs, it results in an extremely rapid pressure rise, as both the desired spark-initiated flame front, and the undesired auto-ignited end gas fumes expand. A combined pressure peak arrives slightly ahead of the normal operating pressure peak, leading to a loss of power and eventual overheating. The end gas pressure waves are superimposed on the main pressure wave, leading to a colliding pattern of pressure that oscillates in the chamber, resulting in that dreaded knocking sound.

Detonation can be avoided using one or all of the following: conservative boost pressure, inter-cooling, water injection and fuel with a higher octane fuel rating. Supercharging, when done properly, will not damage your engine.

### How a Supercharger Works

There are several different types of superchargers that can be placed into two categories: fixed-displacement and centrifugal.

Fixed-displacement superchargers (Roots and twin-screw) move a fixed amount of air during each cycle, like those manufactured by Eaton, Whipple and Kenne Bell. They also prevent the air from flowing backward through the system. Centrifugal superchargers, such as those from Paxton, Garrett and ProCharger, on the other hand, act more like a squirrel-cage blower, flinging the air into the sides of the compressor housing and using the inertia of the moving air molecules to do the compressing. Centrifugal compressors are not considered fixed-displacement because the amount of air they compress with each revolution varies with rpm, and it's possible for air to reverse its flow through the compressor. So we have two fundamentally different methods for supercharging an engine. Which is best is a matter of application.



■ The diagram explains how air (shaded area) enters the twin-screw passage. As the rotors turn in toward each other, the air is compressed and forced out to the intake manifold. It's very efficient and powerful because velocity is as, if not more, important than volume.



## Roots-type Superchargers

The Roots supercharger is the oldest and simplest of the fixed-displacement superchargers. Francis Roots invented the design in the 1860s for use in blast furnaces. It consists of two, intermeshing, counter-rotating rotors. The rotors trap air from the inlet between the rotor cavities and the supercharger housing. As the rotors spin in opposite directions from the center out to the edge of the housing, air is moved to the outlet side of the housing. It's important to note that no compression is taking place within the rotor system. It simply moves air from one side of the housing to the other. Compression occurs when the air, which was taken from the inlet at atmospheric pressure, is forced into a container (intake manifold) that has a finite volume.

The Roots supercharger makes peak boost at very low rpm, and on many applications you can feel the benefit in as little as 2,000 engine rpm. This makes it an ideal candidate for small engines that need an infusion of power in the lower end of the power band. Durability is also enhanced by this slow-rotating trait.

The Achilles' heel of the Roots supercharger is thermal efficiency. A Roots compressor produces a lot of heat. Its use, however, is widespread due to the reliability and level of development. This is why OEMs use the Roots supercharger. Ford has been using Eaton Roots units for more than a decade on SVT Mustang, Lightning and GT models.

## Twin-screw Supercharger

The twin-screw supercharger is a more recent iteration of the Roots design. Some performance gurus believe it is more advanced in terms of design and efficiency. It is also one of the most difficult units to manufacture. Tolerances are critical and the components have difficult shapes to form. The twin-screw design is more efficient and can produce significantly less heat than a Roots compressor; thus, it requires less power to drive it.

It works by meshing two counter-rotating screws inside a casing. Air becomes trapped between the casing and the screw lobes and is pushed forward toward the discharge port. The intermeshing screws are formed so that the volume between them diminishes as they rotate. This means that the twin-screw design compresses the air before it reaches the discharge port rather than after it like in a Roots supercharger.



■ **Need 707-hp (like who doesn't)?** It can be found in either the Dodge Challenger or Charger SRT Hellcat models. Two air-to-liquid after-coolers are in place to relieve the heat built up during extreme compression. A unique singledirection clutch on the input shaft keeps the unit from back-driving the engine when you get out of the throttle. Manufactured especially for Dodge SRT by IHI Turbo America, each of these superchargers weighs 80 pounds.

OUR SUPERCHARGERS HAVE EVOLVED ALONGSIDE OUR ENGINES, AND NO  
MATTER WHICH OPTION YOU CHOOSE, YOUR RIGHT FOOT WILL  
BE SURE TO THANK YOU. CHOOSE WISELY AND GO FAST.

The twin-screw supercharger combines efficiency with the ability to create high levels of boost. It too is a fixed-displacement design.

## Centrifugal Supercharger

A centrifugal supercharger looks and acts like a squirrel-cage blower, which is related to your common household blow dryer. After drawing the air molecules into the center of the supercharger compressor, it throws them outward, into a supercharger scroll. The supercharger scroll acts as a chamber to collect the air molecules and channel them toward the supercharger discharge tube so they can be forced into the engine's air intake. The diameter of the scroll increases as it moves further away from the center of the supercharger, which slows the flow of the air while increasing the pressure.

The centrifugal supercharger compresses the air primarily at the point when the air leaves the supercharger impeller and is forced into the supercharger scroll. At this point the air is

pushed through a venturi-shaped bore. The compression peaks at the apex (narrowest point) of the venturi before passing into the scroll for discharge. This compression method allows the centrifugal supercharger to deliver a fairly high degree of thermal efficiency, however, in order to produce significant amounts of boost, the centrifugal supercharger impeller must spin at a very high rate of speed. In fact, the amount of boost produced by a centrifugal supercharger is proportional to the square of its impeller speed, which enables the centrifugal supercharger to make very high amounts of boost in the





upper half of the engine's power band. This makes the centrifugal supercharger a less desirable application that requires high torque at low engine rpm.

### Inter-cooler/After-cooler, Charge-cooler

The term inter-cooler is technically a misnomer commonly applied in forced induction applications. The official term for cooling the air charge after the compressor before the engine is after-cooling. Inter-cooling refers to a charge-cooler located between two compressors, such as with many aircraft applications. Misuse of a word as common as "inter-cooler," though, isn't easily remedied, and here we are. At least you know what you're supposed to say. A charge-cooler is a device that cools the air charge going into an engine; specifically an after-cooler cools that charge after it is supercharged but prior to reaching the intake manifold. Technically, an inter-cooler does the same thing after one compressor before another. Of course, if you classify the internal combustion engine as a compressor rather than a pump, the term inter-cooler could be used with minimal stretching.

After-coolers have a variation on the traditional concept, where the functional simplicity of using ambient air to cool the intake charge is traded for the more mechanically complex but easier to fit (typically) closed-loop water cooling. It's a confusing tradeoff, air-to-air after-coolers have few moving parts but more high capacity tubing

■ Dodge uses a more conventional yet equally as extreme Whipple supercharger on its Drag Pak Challenger with a 354-cid Hemi designed to compete in NHRA sportsman classes.

■ Supercharger boost can be manipulated with the use of different pulley sizes. This unit, for an '05 Ford GT, can push 18-psi with a pulley swap. Kenne Bell Superchargers claims a few simple upgrades can help the Ford engine produce more than 700 rear wheel horsepower.

and can suffer excessive boost surge or frictional losses due to the lengthened charge tube and large internal volume of the air-to-air cooler's core (between supercharger and manifold). Air-to-water after-coolers (though they can use other cooling mediums besides water) have more parts: pump, charge cooler, tubing, reservoir and radiator, but all of these items are relatively small or replace parts already in the supercharger's system. Being pump driven, an air-to-water after-cooler can temporarily keep charge temperatures down while the vehicle is motionless, though like an air-to-air after-cooler the radiator that cools the water is most effective with air flowing through it. This brings up another question: Does the radiator being used to cool an air-to-water after-cooler merely create a redundant need for more air-based cooling (actually being air-to-water-to-air), rather than provide an alternative? Turns out water will absorb more heat with less temperature rise than air, so it is a more effective cooler, and the radiator on an air-to-water charge-cooler can be smaller, thus reducing the need for the massive airflow exposure required by an air-to-air cooler.

### In Summation

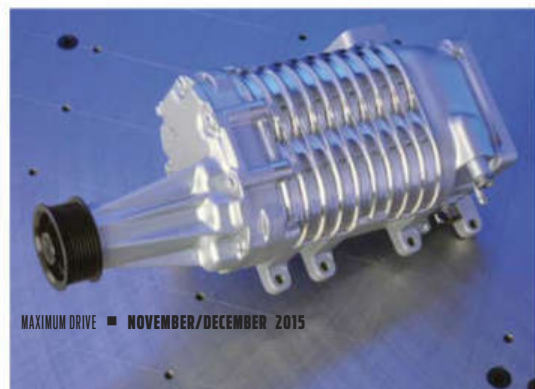
Supercharger efficiency and design has evolved since the days of the gigantic Roots blower. More efficient Roots configurations, high-tech and high-efficiency twin-screw designs and affordable centrifugal options all will make more power, it just

happens in different ways. Modern engines are designed close to the edge of their performance envelope. Rather than being overbuilt, they are built to achieve projected performance with optimum reliability. Unfortunately for the performance enthusiast, this means that easy power enhancements are few and far between. Airflow in the heads cannot be improved by hogging out material because that material just isn't there like in the days of old. The refinement of a factory engine, however, is much higher than it was in the old days and big leaps in power are no longer convenient. Supercharging is one of the most effective ways of making said leap. Luckily, our superchargers have evolved alongside our engines, and no matter which option you choose, your right foot will be sure to thank you. Choose wisely and go fast.

**MD**



■ Of course, when the word "blower" is tossed around, this is what we think of, a GMC 8-71 or 6-71 like the ones used on Top Fuel dragsters and Funny Cars. This vintage photo is the original Shelby Super Snake driven by Don "the Snake" Prudhomme in 1968.





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# MULTI-TASKR

The Evolution of a Chameleon Corvette

TEXT BY LOU LETO ■ PHOTOS BY HENRY DE KUYPER





**Jerry Bentley** could have taken an easy route to his next car. With a last name like his, he could have chosen his namesake vehicle, full of sophistication and elegance, a hand-built luxury machine equipped with ultra-fine appointments and high-tech refinements. It would have been a Bentley and no one would have dared raise a judgmental eyebrow. Or, given the fact that he recently retired from a successful career in the confectionery industry, his next ride could have been a detailed showpiece that was just as sweet. But, since he was immersed in the rich SoCal and Arizona car cultures, smooth and easy just weren't the direction Jerry was headed in.





After owning a '55 Chevy Gasser, a '68 427 Corvette and a '32 Ford roadster adorned with 3x2s, as well as being involved with his son's '69 Z/28, something soft and quiet or all show and no go wasn't his style. Aside from these undeniable factors, his Arizona neighbor, the legendary drag racer John Loper, also influenced Jerry's thirst for high horsepower. "I watched Loper build two Gassers," Jerry said, his face beaming. Instead, one might say the choice for his next project became channeling all of the above influences.

"The target of my next project was a numbers car," Jerry admitted. In 1993, while combing through the Orange County California *Auto Trader*, he discovered and purchased a distressed '62 Corvette. The rode hard and put away wet classic was



■ Vintage Halibrand wheels provide a period-correct look. Hiding behind the alloy and rubber is a C4 chassis.

represented as a "matching numbers" car, making it an intriguing purchase. While the cosmetics were ugly and the components worn, he was able to drive it across the desert to his home in Phoenix. "At the time, it was a two-top, Roman Red car with a black interior, 327 four-barrel carburetor engine and a four-speed tranny." "My plan was to do a complete restoration, top to bottom, and while I had been involved in building the earlier cars, this Corvette was my first big project," Jerry confessed.

Restoring a period-correct Corvette from this era can be a painstaking process. Chasing authentic,



matching-number parts and hardware is time-consuming and costly. Along the way, Jerry was so precise as he sought out new, original black interior components that it took him two years to finish the car. "I was proud that I was doing it correctly, as my plan was to enter serious shows so the vehicle could be judged." As a sidebar: it's ironic that later he was transferred and relocated his family to south Orange County (California) before the project was finished, so the Corvette was completed back in the same geographical area where it was found.



As Corvette history goes, 1962 was a very significant year with a combination of lasts and firsts. There were some typical model year changes, giving the last model of the first generation Corvettes (the 1953-62 models are referred to as C1s) a less busy look. Gone was the trim around the side coves and with it there were no two-tone paint options available; only monochromatic exterior paint color schemes. The rearend of the car continued with the quad taillights introduced with the 1961 model, a design that was the signature element of Corvettes for many years to come. It was also the very last year that Corvette had a formal trunk, with a hinged, opening deck lid, that could be easily accessed for rear storage.

The changes in 1962 were not just aesthetic. The true marker for change, and desirability for future collectors, was mechanical. Already earning the title of America's Sports Car, the Corvette development team, encouraged by Harley Earl, Bill Mitchell and Zora Arkus-Duntov, did not rest on their laurels. They were hungry for more power, and there was an easy solution by subscribing to the old adage, there is no substitute for cubic inches. The 283 V-8 engines residing under the hoods of the last four years of Corvettes was enlarged by 15%, creating a similar increase in the top horsepower rating of their most radical production engine. Now all 1962 V-8s offered in Corvettes were enlarged to 327 ci. The 'Vette crowd was a performance-oriented group, reflected in the statistic that 77% of the cars sold in '62 were

## AFTER A FULL RESTORATION, I TOOK THE CAR TO THE COAST CORVETTE SHOW TO BE JUDGED. IT RECEIVED 90 OUT OF 100 POINTS.

equipped with a four-speed manual transmission. Nearly all first year 327 base and option engines came with single four-barrel carburetor with increased horsepower ratings; the two four-barrel carb (dual quad) versions of prior years were no longer offered. The exception was the top-of-the-line, high performance engine, which was a high compression, big cam version, again topped with a Rochester fuel-injection system (fuel injection was first offered in 1957), now with a 360-hp output. It made the fiberglass car, weighing less than 3,000 pounds, scream on the street or at the track. The 360-hp engine was an expensive option at nearly \$485, which was probably one of the reasons only 1,918 fuelies or F.I. 'Vettes were built during the 1962 Corvette production of more than 14,500 vehicles. It doesn't take a great quantity for legends to be born.

The following is the evolution of Jerry's '62 Corvette that could ultimately be referred to as a special fuel-injection car, and could be considered

■ The interior has an original feel but with a number of added elements such as the padded console and subtle seat bolsters all in red leather.

as F.I. car number 1919.

As Jerry put it, "After a full restoration, I took the car to the Coast Corvette Show to be judged. It received 90 out of 100 points. It was giggled for a bit of dirt found after a swabbing by a Q-tip, along with having one wrong bolt." Bentley left the show and decided that driving was more important than showing, and within months went back to his hot rod roots. He cut the front coil springs to give the two-seater a more aggressive look via a lower the ride height. He installed Halibrand wheels on his otherwise freshly rebuilt 'Vette. Just a few months following that initial judging experience, Jerry drove the car for the next five years. During that period, he changed the color from Roman Red to Ferrari Pearl Fly Yellow.

"One day, reading the car mags, I saw a great-looking '62 'Vette feature. I decided that I wanted that look," he explained.







The car was once again taken completely apart. However, the project was scheduled for an entirely new direction. The front section of the frame was replaced with a modern C4 Corvette suspension, including power steering. Bigger brakes, with a power booster, and a McLeod clutch were added. The original four-speed manual transmission was swapped for a Tremec six-speed. As much bigger horsepower was planned, the rear was reconfigured with a stout Currie Ford 9-inch rear axle mounted in an engineered four-bar and a coil-over suspended sub-frame. A fabricated rear cross member was given a new radius in order to clear the fully ceramic-coated, large diameter exhaust system that featured Flowmaster mufflers.

That potent power plant meant bigger M/T Sportsman rear tires were needed, so the car was mini-tubbed to



■ The 427-CID engine from World Products is topped with a unique Hilborn fuel-injection system that was dialed in by Bob Ream. In order to fit the intake under the factory hood, special motor mounts were fabricated to lower the engine.

accommodate the fatter footprint. He swapped his original Halibrand wheels for a modern, stronger, similar-looking type, still keeping 5x15 front and 12x15 rear staggered sizes.

The entire reconfigured 1962 frame was powder coated. While work was done in two different shops, Jerry offered volumes of compliments about Bryan's Custom Restorations. "Bryan Barba is still the designated caretaker for the tweaks," Jerry told *Maximum Drive*.

In later years, a 406-ci engine, built by legendary race shop Traco Engineering, was installed. A typical hot rod guy, Jerry often experimented with various single four-barrel carburetor intake manifolds in the search for more power.

Driving around one day, Butler stopped to see his friends at Mooneyes; Chico Kodama mentioned some unusual used race-purpose fuel

injection units that might be available through another contact, an Augie that was a frequent seller at the Long Beach swap meet. "It's always polite to follow-up on a lead," Jerry said. "Augie showed me a mind-boggling Hilborn fuel-injection system; I had never seen anything else like it. While Augie told me it wasn't for sale even before he showed it to me, I immediately started negotiating and bought it the very same day." The next phase of Corvette modification was underway.

"I brought the exotic system to Bob Ream in Arizona, as I knew his reputation as a fuel-injection guy from his experience earned while racing sprint cars. I tasked him with converting this Hilborn racing system into a working application for my street car," Jerry said.

The desire to maintain the Corvette factory appearance from the outside required more



engineering. Out came that 406-ci engine that had been installed a few years back, to allow for frame and engine mount fabrication so the Hilborn system would fit under the factory hood. That required the engine to sit lower. The same engine was then fitted with the unusual intake manifold and unique fuel-injection system and reinstalled in the vehicle.

“Since it did not look like the typical straight-up Hilborn vertical stack design, I did some research to learn more about the fuel injection,” Jerry said. Making an inquiry directly to the factory, with the stamped serial number in hand, he obtained a certificate of confirmation and authenticity that it was originally ordered and delivered to Engines by Unser in Santa Ana in August 1968. That Unser was Louie, a brother in the Unser clan that included multiple Indy 500 winners Al and Bobby. Louie was a long-time Indy crew chief before starting his Southern California engine shop where he built engines for Bobby, Mario Andretti, and others for their Pikes Peak, sprint, sports car and speedway events. The Hilborn records showed that Jerry’s system was originally set up for methanol, with a small percentage dose of nitro.

Later, seeking even more power, yet keeping the look and lighter weight advantage of a small-block, Jerry selected a



Motown crate engine available from the World Products catalog. “I wanted a 427 and that Hilborn system,” Jerry emphasized. Now up 100 cubes from the original 327, the new 427-ci engine came complete with World’s own cylinder head and four-bolt main block castings, with forged 10.5:1 pistons. Jerry selected a special grind from Comp Cams. When the engine arrived, Jerry asked Bill Mitchell to work his tuning magic. With the as-delivered intake and four-barrel intake carburetor, along with coated S & S sprint car-style headers, dyno results of 564-hp at 5,900 rpm, with 546 ft-lbs of torque at 4,900, are documented. “And with the install of a Hilborn system, typically one should consider it might add at least another 100 horsepower,” Jerry said. For those who just read the *Cliff Notes*, that’s more than 660 horses, 300 more than the highest-rated Corvette engine back in 1962.

The transformation continued. Driving it around so many miles caused a few body cracks to surface, and the Pearl Fly Yellow paint could not be matched. So, the car came apart again, this time to be coated in deep black. C1 Corvette fans will recognize the countless hours of preparation necessary for the fiberglass body to be ready for the application of the dark hue. In 1962, the factory color was identified as Tuxedo Black. For the interior, noted custom upholsterer Ron Mangus was called upon to reshape the bucket seats before he covered them in stunning red leather in a style similar to the original 1962 pattern. The door panels and trunk also received the same treatment.

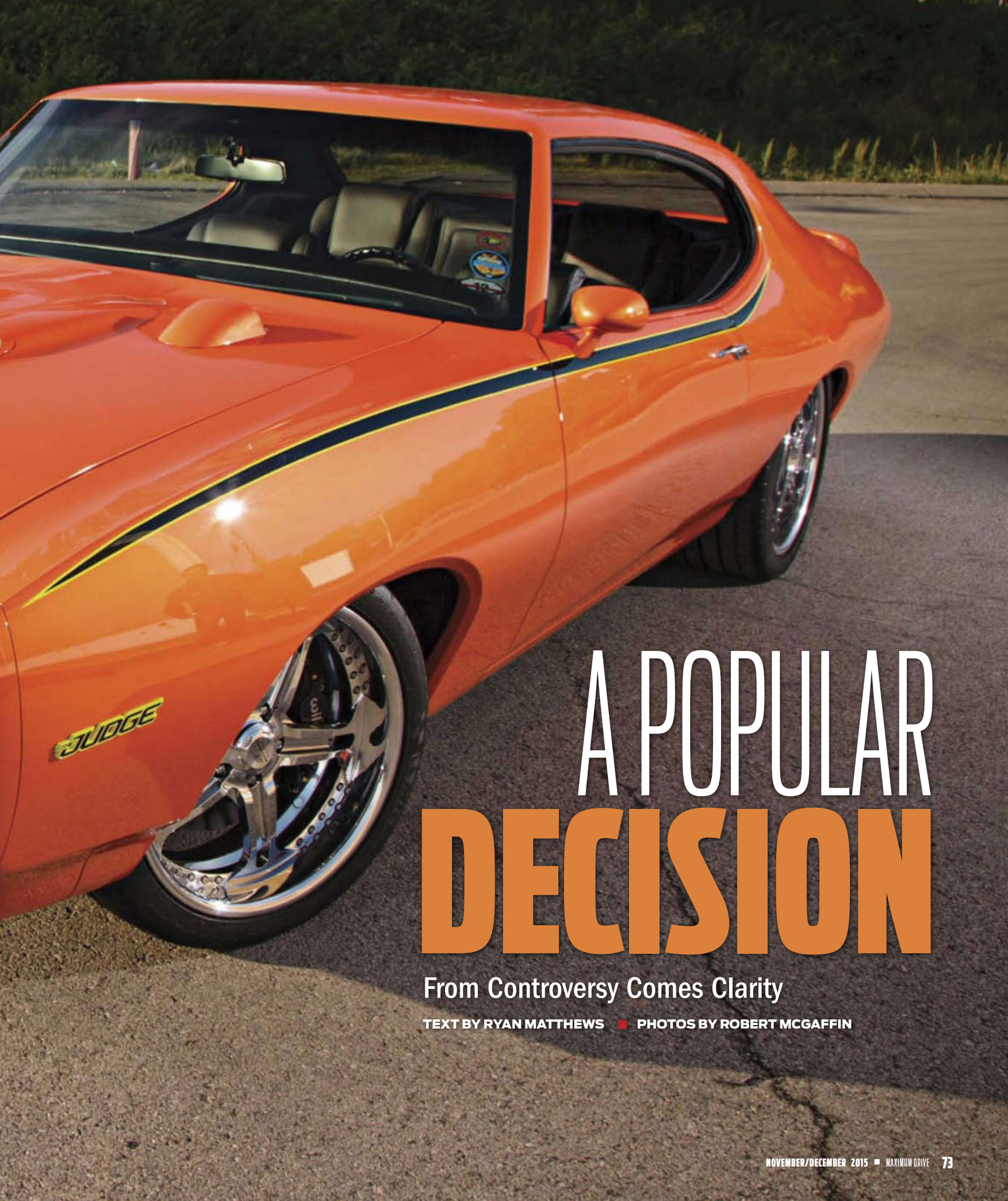
As a hot rodder, Jerry is a driver and continues to use his high-powered Corvette frequently. It’s not unusual for he and his wife Barbara to roll from their home in Southern California to Phoenix to visit friends or attend car events. He’s accomplished his goal of keeping the exterior intact while making it his interpretation of a modern machine with significant power and improved handling in a 1962 wrapper. Here it is years later, perhaps answering the rhetorical question, “Where were you in ’62?” with an updated response: having fun in a unique one-off F.I. Corvette. **MD**



**During the build or restoration** of any car, there are a few big decisions and millions of smaller ones. Usually the major issues become the easiest to make as in which car, what color to paint it, which engine to build, etc. It's the multitude of little dilemmas that often cause the greatest angst. These smaller quandaries often mean the difference between a nice car and an awesome build. For Tom Farnsworth of Pinedale, Wyoming, the act of standing in judgment of his own instincts is what made his '69 Pontiac GTO Judge the crowd-pleaser it is.







# A POPULAR DECISION

From Controversy Comes Clarity

TEXT BY RYAN MATTHEWS ■ PHOTOS BY ROBERT MCGAFFIN



Tom was first exposed to Pontiac's marketing genius in the spring of 1969. By that time the GTO was already one of the staples of the muscle car scene. The new A-body debuted in 1968 with a shorter wheelbase shared with the Chevelle and 442; however, the GTO was the only A-body with the new Endura color-matched front bumper. This made it look even better and further established the model as the biggest influencer in its class.

During the '60s, each division of General Motors had its own distinct personality. Cadillac was the aspirational upper crust. Buick



■ Weber Auto Interior of Minneapolis stitched the black leather interior. The steering column is from Ididit attached to a Billet Specialties steering wheel. Gauges are from Speed Hut. Shifter is a Lokar with a Bowler shift handle. Seats are ProCar buckets with a custom center console in between.



was the refined, conservative brand. Oldsmobile was looked upon as unique and innovative. Chevrolet was all about youthful appeal and blue-collar work ethic. Pontiac was the wild and creative one, and nothing confirmed this more than the release of the GTO Judge.

The Judge was an over-the-top variant believed to be inspired by Flip Wilson's character on the hit NBC variety comedy show "Laugh In." As a boy living in New Castle, Wyoming, Tom first saw a Judge via a friend's older brother. "I was 13 when I saw this bright orange GTO. It was amazing with the fender licks, hood-mounted tach, rear wing and the word 'Judge' on the nose of each front fender. It was the coolest car I'd ever





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■ The signature GTO hood with its distinctive twin scoops was kept.

seen,” Tom said. The image of the Judge stuck with him for the next 30 years. During that time he owned many muscle cars, but there was always an open parking space waiting for a Judge.

“Thank goodness for eBay,” Tom proclaimed. Twelve years ago, while browsing the online auction site, he came across a ’69 GTO Judge. There it was, a slightly modified version in the famous bright orange (actually called Carousel Red). After reading the full description, he learned that it was not an original Judge, but a GTO Judge tribute car. At first he was slightly disappointed, but after further consideration, Tom assessed the possibilities and opportunities. Here was a chance to build a better, personalized Judge without destroying one of the 6,725 that came off the Pontiac assembly line. He also realized the entry level price would be far less than starting with an actual Judge. He was right about one of those thoughts.

The long distance purchase was made, and the car was shipped from Phoenix to Pinedale, Wyoming, a town whose motto is “All the Civilization You Need.” If you’re a car guy, then Tom’s garage is where civilization begins in the western part of the state, and life was about to get quite a bit wilder.

The Judge was a driver for a short while before major changes took place. The first step was a full-tilt Butler 468-cid engine built by Pat Monan at Southside Service in Deadwood, Wyoming—yes, that Deadwood. A tricked-out GM 700R4 tranny was added to handle the 650-hp. “Once the engine was in, it didn’t take long to convince myself that too much is never enough,” Tom admitted. There



■ What looks like a subtle reworking of the nose is actually quite extensive. What most don’t notice are the round running lights (in place of the original squared-off units), the lower vent grilles with aluminum trim and the custom grille panels. All offer a far more finished appearance.





A MORE RADICAL MODIFICATION WAS PERFORMED ON THE REAREND OF THE JUDGE. **THE OLD, BULKY CHROME BUMPER WAS CUT INTO PIECES AND REWORKED BEFORE BEING STRIPPED, PRIMED AND PAINTED.** THE LOWER VALANCE WAS FITTED WITH RECTANGULAR EXHAUST PORTS.

was only one way to go, full out.

Tom had trusted G3 Rods of Rapid City, South Dakota with several other projects, so turning the Judge over to Ryan Gruba and his brothers was natural. According to Tom, there was a rather unique beginning to the project. "When it was sent to G3, I had just put a new set of BFGs on it. Shortly after it arrived at their shop, I was sent a video of the Judge doing a smoky burnout. When I went to check on the progress of the build a few months later, the front tires still had the stickers on them. The backs, however, were toast. I gave them the okay to give the 468 engine a test, so it was all on me. In good fun, though, I still kid them that they owe me a set of tires."

The plan was to execute a



■ The body stripes are akin to the original Judge fender contours, but are actually completely different. "The idea was to have the color look similar at a glance," Tom said. However, the now painted-on versions accentuate the sexy bodylines far better. Also improved were the "Judge" markings on the nose.



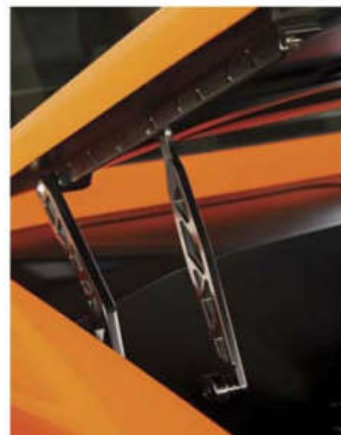


■ Billet Specialties Fury wheels in 20x10 rear and 18x9 front are surrounded by Michelin Pilot Sport tires. It's a modern take on the "big for burning" and "little for turning" idea of the past.

number of subtle changes to the classic Pontiac A-body design. These included flush-mounted glass and a slight change to the arch of the rear window. More radical modifications included reforming the tail section. The massive factory chrome bumper was cut into multiple pieces, reassembled, then stripped, primed and painted. It was blended with a section that integrates into the bodyline as it dives toward the ground. The taillights were also custom crafted to better contour into the overall shape of the car. The signature rear deck wing remains to keep the look familiar, yet different.

If it worked for the rear, it'll work for the nose. The Endura front bumper was removed and replaced with a steel bumper from a 1968 Le Mans. Like the rear bumper, the front unit was sliced and diced until the fit was perfect. It was acid dripped and stripped, primed and painted to match the body color. A new lower valance was formed with round running light ports and special air ducts. The work was so well planned and executed you would think it was performed by one of the old masters of customizing like Carl Casper, Gene Winfield or Darryl Starbird.

One item that was on the chopping block was the original hood-mounted tachometer. "I said, 'No way, that's got to stay' and kept to my guns," Tom said. In the end, all agreed that the customer





is always right, especially in this instance.

As healthy as the big engine was, G3 gave it a makeover with a full menu of new performance and cosmetic components, including a Billet Specialties Serpentine system, Doug's headers and Lokar cables. The tranny was swapped out for a Gearstar 200R4. Suspension improvements were performed using an Art Morrison GT Sport chassis, Wilwood braking system and a Strange-built Ford 9-inch rearend. Progressive rate coil-over springs replaced the old blacksmith leafs. Finally, Billet Specialties wheels were selected in a modern version of "big and little" with 18x9 front and 20x10 in back with appropriate Michelin Pilot Sport rubber. It was designed to nicely tuck in the mini-tubs of the narrowed rearend.

There was plenty of regular bodywork to perform, and then the G3 crew took to doing things to the extreme. Once the car was down to metal, issues arose. This was not unexpected. After all, we're talking about a General Motors car built in the late-'60s. Original panels don't last forever and new rocker panels, door skins and a roof panel were graphed in. Perfection, or as close as humanly



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possible, was the goal. It took a great deal of time to achieve precise body fit with consistent door, trunk and hood gaps.

When the body was straight and the fit tight, Glasurit primer was applied, sanded and applied again. The two-stage Carousel Red was sprayed and covered in clear. When the body was color-sanded and buffed, the results were stunning.

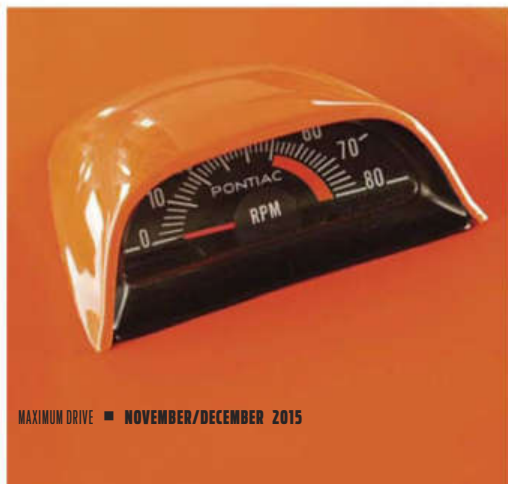
All this time, the interior panels and seats were being crafted at Weber Interiors in Minneapolis. The rich black leather with gray stitching covered the ProCar bucket seats, custom center console, kick panels and rear seat. Weber also worked its magic on the Billet Specialties steering wheel.

G3 hid all of the audio components in strategic

trunk compartments. Weber then matched the look of the interior with custom panels and carpeting. When all of the interior pieces were completed, G3 laid down a foundation of Dynamat before performing a white glove installation and finished off the cabin with Speed Hut gauges, Lokar shifter, Bowler shift handle, Clayton pedals and door handles.

G3 delivered the custom Judge back to Tom two years ago. Since that time it has seen action at events from Reno to Oklahoma City. Tom insists the pristine Goat is a driver. That makes sense since Pinedale (population 2,100) isn't exactly what anyone would call a hotbed of automotive activity.

The car's aura attracts a great deal of attention no matter where Tom takes it. "It just seems to draw people in. Maybe it's the color, or the details, or the overall execution, but it does create a crowd," Tom admitted. Getting noticed is what the Judge was all about when it was introduced in 1969. Tom's ride proves the lasting allure the GTO Judge was designed to achieve. His version, tribute or not, may be the country's prime example of the essence and influence Pontiac once had on the American automotive market. **MD**







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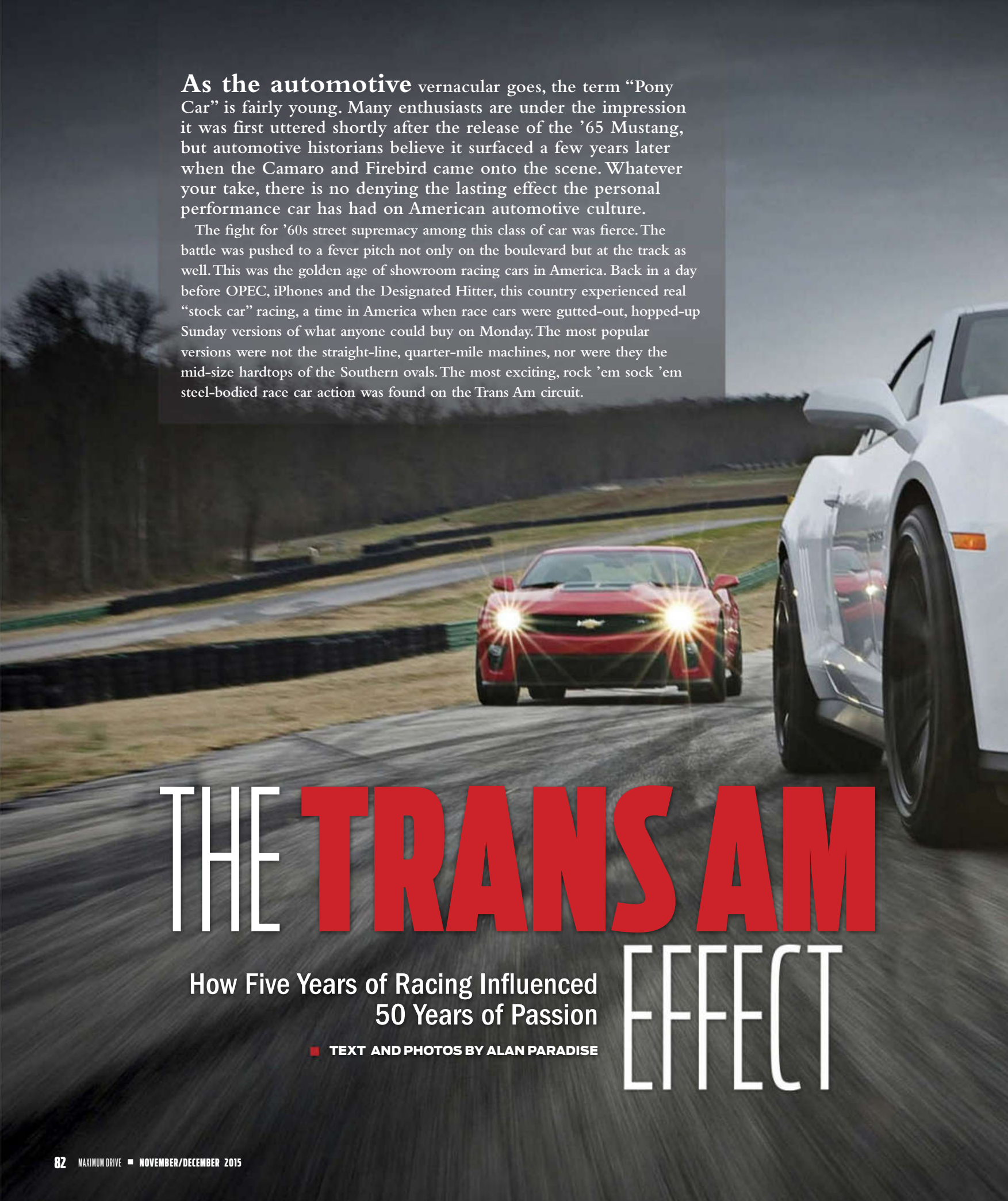
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**As the automotive** vernacular goes, the term “Pony Car” is fairly young. Many enthusiasts are under the impression it was first uttered shortly after the release of the '65 Mustang, but automotive historians believe it surfaced a few years later when the Camaro and Firebird came onto the scene. Whatever your take, there is no denying the lasting effect the personal performance car has had on American automotive culture.

The fight for '60s street supremacy among this class of car was fierce. The battle was pushed to a fever pitch not only on the boulevard but at the track as well. This was the golden age of showroom racing cars in America. Back in a day before OPEC, iPhones and the Designated Hitter, this country experienced real “stock car” racing, a time in America when race cars were gutted-out, hopped-up Sunday versions of what anyone could buy on Monday. The most popular versions were not the straight-line, quarter-mile machines, nor were they the mid-size hardtops of the Southern ovals. The most exciting, rock 'em sock 'em steel-bodied race car action was found on the Trans Am circuit.



# THE TRANS AM EFFECT

How Five Years of Racing Influenced  
50 Years of Passion

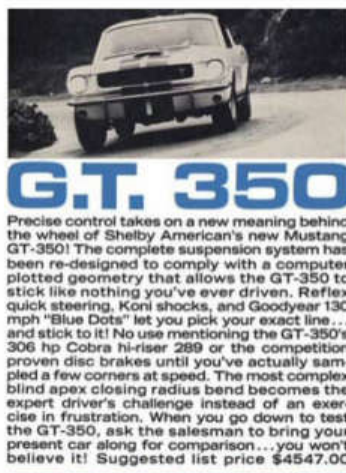
■ TEXT AND PHOTOS BY ALAN PARADISE





■ Nearly 50 years have passed since the first SCCA Trans Am race took place. Its effects on the American performance car market are still being felt as old rivalries between Chevy, Ford and Dodge have resulted in hot new cars such as the Camaro ZL1.





■ This is the Shelby mule GT-350 car being readied for the 1965 Trans Am season. Note the subtle rear fender flare treatment. Before the season began, print ads hyped the superior performance of driving a GT-350 for a mere \$4,547. These track-prepped Shelby Mustangs are highly coveted and live on the vintage racing circuit.

Between 1966 and 1971, this style of stock car racing forced its drivers to swap paint at breakneck speeds on America's most challenging road courses. It attracted the biggest names in motorsports, such as Penske, Donohue, Jones, Gurney, Titus and Shelby, to name a few. It developed an extremely loyal fan base that included those who were equally as loyal to NHRA drag racing and NASCAR.

Coming out of the '70s, NASCAR clearly won the auto racing war. However, until 1972, Trans Am provided a battle. At the height of the Trans Am glory, from 1967 to 1971, the series was far more entertaining and competitive than any other form of racing.

NASCAR and SCCA Trans Am racing have as much in common as they do differences. While NASCAR is today's most dominant form of motorsport, it could have just as easily become a second place series to Trans Am. It was, however, not to be. The primary reason for the fall from grace as the best American racing series in history is due to inner politics and over regulation. Like all good things, sooner or later its success became its demise.

The thrust of Trans Am racing happened due to the enormous success of the Ford Mustang and Chevrolet Camaro. Both cars sold so quickly that rival automakers reaped the benefit from the overspill with models such as the Firebird, Cougar, Falcon and Barracuda. Pony Car enthusiasts prepared their cars for use in sportsman-style track racing. As much of this activity was under the banner of the SCCA, the club wisely seized the opportunity and established classes with a National Championship category. The SCCA set up Group 2 cars under FIA Appendix 2. The amateur classes were based on displacement: A was 2000cc to 5000cc, B was 1300cc to 2000cc and D was less than 1000cc.

Trans Am officially began on a spring afternoon in March of 1966 at Florida's Sebring Raceway. The day was filled with actual bumper-to-fender



■ The late Jerry Titus was one of Trans Am Racing's first star drivers. He captured the 1967 driver's championship in the #17 Mustang. You can see how close the race cars and the street versions were in terms of basic engineering and sheet metal.



## BY 1968, THE FORD VS. CHEVY WARS WERE IN FULL EFFECT. NO PLACE WAS THIS WAR MORE MIGHTILY FOUGHT THAN ON THE TWISTS AND TURNS OF THE TRANS AM SERIES.

action as drivers in Mustangs, Darts and Barracudas manhandled their domestic sports coupes, fastbacks and hardtops around the various surfaces that made up the famed racing circuit. Ironically, the checkered flag cascaded over Austrian F-1 driver Jochen Rindt driving an Alfa GTA.

Throughout the following months, Shelby-built Ford Mustangs attempted to dominate the series on seven different tracks from Watkins Glen to Riverside. During the fight for the first championship, Ford and Chrysler battled for the points lead right up to the last two races. At Green Valley, Brad Booker and John McComb, driving a Shelby Group 2 Mustang, finished ahead of the Team Starfish Barracudas and Group 44 Dodge Darts for the win, tying the standings at 37 each for Chrysler and Ford. Going into the final race of the season at Riverside, Jerry Titus drove a Shelby Group 2 Mustang to victory handing Ford the first Trans Am manufacturer's championship.

In 1967, Titus won the driver's championship and provided Ford its second manufacturer's title. During that year, General Motors launched vehicles from its Chevrolet and Pontiac divisions that would force Ford and Chrysler to accelerate their racing efforts or be eliminated from contention.

Chevy's new Camaro was designed to thwart the immense popularity of Ford's Mustang. Pontiac's Firebird, built on the same platform as the Camaro, championed the brand into the sales and racing wars. During that time, Chevrolet executive Vince Piggins understood the powerful youth market allure of Trans Am racing. As soon as the Camaro was ready to be track-proven, he committed Chevrolet to the series and personally took control of what came to be known as the Z28 project. The more formidable challenge was the engine displacement restriction. At the time Chevy's performance small-block V-8 was 327 ci. SCCA rules were set at no greater than 305 ci. Chevrolet Racing engineers placed a crank from the old 283-ci engine into the 327 block. The result was a 302 template that would later be used to develop the

famous 302 aluminum block engines for the 1967-69 Z28s. Chevy won only three races in 1967, but the data collected from competition was enough to make much bigger things happen for Chevy and Trans Am racing the following season.

By 1968, the Ford vs. Chevy wars were in full effect. No place was this war more mightily fought than on the twists and turns of the Trans Am series. With support from Chevrolet, Roger Penske armed his second year Z28 team with driver Mark Donohue, an emerging superstar of the auto-racing world. The Penske/Donohue team proved nearly unbeatable in 1968, winning 10 of the series' 13 races. Both the racing Z28 Camaros and Shelby-prepped Mustangs helped sell cars. Chevy sold over 235,000 Camaros (of which 7199 were Z/28 models), while Ford sold 317,000 Mustangs. The Mustang number is



■ **Early Trans Am pit action was not as chaotic or as safety conscious as today's racing action. Here Ronnie Bucknum checks in to converse during practice laps at Lime Rock. Note how calm Carroll Shelby (in hat and coat) seems to be.**

■ **After getting smoked by Chevrolet in 1968, Ford released a new Mustang that included the Boss 302. It was a major win on the street and at the track.**

remarkable given that the first-generation body style had grown woefully weary.

Chrysler, on the other hand, was swimming in mediocrity. At the beginning of the 1969 Trans Am season, the Mustang Boss 302 was unveiled and the Penske Camaros were being fitted with even more horsepower and handling setups, both on the track and in street trim. Plymouth was still saddled with the Barracuda, while Dodge enthusiasts had only the brick-shaped Dart to cheer for. It had become all too clear that before long both Chrysler brands would need to make serious changes.

In the meantime, despite the new engineering, body styling and a 302 power plant, Ford failed to catch up to Chevy on the track. Once again, Mark Donohue ran away with the driver's title and Chevrolet took the factory bragging rights. On the street, however, the story was far more encouraging. The new Mustang sold extremely well with the Boss and Mach-1 being the halo models.

Major changes in teams and rules made the 1970 Trans Am campaign a true knockdown, drag-out fight from beginning





to end. The big news was that the cubic inch restrictions of a maximum of 305 no longer applied to the street versions. Now the redesigned Z28 could be fitted with the LT-1 350 for showroom models and the new Dodge Challenger and Plymouth 'Cuda would offer the 340. To make matters even more complicated, American Motors was in the game with the Javelin.

What made it possible for AMC to enter the field was the signing of Roger Penske. AMC was desperate for a fraction of the brand recognition lavished on Mustang and Camaro. In fact, AMC would have been happy to be as well respected as the Mercury Cougar (which pulled out of Trans Am after the 1969 season). The Javelin was AMC's only true potential racing platform. The problem was that the smallest production V-8 engine offered in the 1970 performance version of the Rambler-like Pony Car was 348 ci. The new street restrictions made it possible for AMC to compete for retail sales while stroking the smaller 290 to achieve a 305-ci race engine.

For the next three model years, Pony Cars were the hot ticket. Sales soared and model variants were plentiful. The effect of Trans Am racing on the ideal that what won on Sunday sold on Monday was more prolific than what was happening in traditional stock car racing and on a par with NHRA Super Stock and Funny Car classes. Performance-equipped Camaro Z28, Mustang Boss 302, 'Cuda AAR, Challenger T/A and Javelin Donohue Edition models had



■ In 1969, Ford put considerable backing into two Mustang Boss 302 teams. Here, Parnelli Jones and George Fulmer battle for position on the old road course in Kent, Washington. As formidable as these cars were, Mark Donohue, in a Camaro Z28, walked away with the title.

## MANY SIGNIFICANT PERFORMANCE TRICKS THAT LATER FOUND THEIR WAY TO THE STREET STARTED BY WAY OF TRANS AM RACING EFFORTS.



■ The Penske Racing Donohue Camaro was so iconic it was reproduced as model kits and in die-cast form, such as this vintage GMP 1:18-scale version of the '68 Z28.



■ Parnelli Jones leads Mark Donohue—now in an AMC Javelin—at Lime Rock during the 1970 season. The final driver's standing would be close as Jones edged Donohue by one point. Ford also grabbed its third manufacturer's championship in five seasons.

become dream machines for a new generation of enthusiasts.

As a testament to the powerful connection between the showroom and the track, the 1970 Trans Am season was the pinnacle of American sport coupe racing. Nearly every team had big name drivers: Dan Gurney, Sam Posey, Parnelli Jones, Mark Donohue, George Follmer, Swede Savage, Peter Revson and Jerry Titus (who was killed during the season in a track mishap). Titus' unfortunate death threw a blanket over the Pontiac team, not to mention sadness over the entire season.

Many significant performance tricks that later found their way to the street started by way of Trans Am racing efforts. Ford race engineers discovered that the heads of the 351 Cleveland engine added much needed volume and breathing capabilities to the tunnel-port 302 block. This improved throttle response as well as torque. After experimenting with this combination in 1969, the exact formula was worked into the engine. This, along with suspension changes, provided the Boss Mustangs with the power and handling to run bumper-to-bumper with the new Z28s as well as the high-dollar Javelins and pesky Challengers and 'Cudas.

It was a monster season as Ford Boss Mustangs were running side by side with the Penske/Donohue Javelin. By season's end, Parnelli Jones squeezed out a one-point driver's championship over Donohue. However, that was the end of the party. In 1971 near all factory support was dropped. Gone were the 'Cudas



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and Challengers. Chevrolet severely cut back its dollar investment, and Ford yanked its support as well. Conversely, NASCAR popularity began to take flight with new television contracts and factory-supported racing efforts. From 1971 to 1974, the series continued to slide in a rapid downhill fashion. The low point came in 1974 when only three races were run.

Although the racing was no longer robust and popularity fell off faster than the horsepower ratings of the decompressed, smog-pump engines in the street cars, the effects of the Trans Am era on the enthusiasts' market continued to be felt for decades to come. EPA and auto insurance companies all but put an end to nearly 10 years of unrestricted street performance. While nameplates like Road Runner, GTX, Challenger, Barracuda, Torino and GTO remained on the scene for a few more years, all were just a shadow of their former selves. What remained as the halo of performance were the three most popular Pony Cars of the Trans Am era: Camaro, Mustang and Firebird.

■ Trans Am racing fell out of favor once manufacturer support dried up in 1971. It made a healthy return in the mid-'90s once Ford and Chevrolet introduced a new Mustang and Camaro. It once again sparked the age-old automotive question: Are you a Ford or a Chevy guy?

As the '70s slipped into the darkness of overregulation and the economic woes of the early '80s, the fate of the Trans Am heroes also diminished. The Mustang went out of production in favor of the Pinto Plus Mustang II, a car Lee Iacocca dubbed "the mini Pony Car." Adding insult to injury, the hottest Camaro (still sporting Z28 badges) was reduced to a measly 170-hp. The Firebird Trans Am, even with the severely detuned 455-cid engine, could only muster 200-hp. The late '70s and early '80s were indeed a dark time in an automotive America. It seemed that the most exciting production-based track action the country had ever seen was gone and forgotten. The accomplishments of great drivers like Gurney, Jones, Titus, Donohue, Savage and Revson only echoed in our distant memories.

In new car showrooms, only the new Fox Chassis Mustang and Camaro IROC-Z brought hope to a once robust performance market. An entire generation of future automotive enthusiasts was lost in the darkness. If not for the Trans Am relics of Mustang, Camaro and Firebird (and to some extent the custom truck scene), there might not have been gasoline dreams for anyone born after 1975.

However, a slight flicker of light inspired by Trans Am racing survived. When the Mustang GT

■ Model year 1970 was the high water mark for street versions of the famous Trans Am racers. The Dodge Challenger T/A and Plymouth's 'Cuda AAR were excellent-looking Pony Cars but suffered from an engineering disadvantage over their rivals. Torsion bar front suspension and 10-inch drum brakes didn't match up well with the progressive rate coil springs and front disc brakes available on the Boss 302 and Z28. However, you gotta love the six-pack intake and side-dump exhaust.

brought the nameplate back to respectability, it forced Chevy and Pontiac to step up their game as well. Ford's television and print ads touted that "The Boss is Back" to the roar of a factory performance car with a four-barrel carburetor, a five-speed gearbox and dual exhaust. The Camaro and Firebird matched Ford's efforts as all jumped back into racing in a much bigger way. IMSA and SCCA events were populated with track versions of the Mustang, Camaro and Firebird.

In 1993, everything took a huge step forward by taking a long look into the past. The new fourth gen Camaro debuted in the summer of 1992, and the Firebird followed a month later. Ford's reply was the SN-95 Mustang one year later. The three holdovers from the Trans Am era of the late '60s and early '70s were back in





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■ Chrysler relied on the tug of the '70 Challenger when designing its latest version. Note the beltline and hood lines as well as the classic long hood and short rear deck. This car cries out to be dressed in vintage T/A or AAR trim.

full competition force, in the showroom, on the street and at the track.

Suddenly, the old days had returned. Racing, once again, became an important part of marketing. Horsepower increased as new technologies allowed for far better engine control and reduced emissions. The old adage "you are what you drive" became a vital part of the ownership image, and Camaro, Mustang and Firebird were viewed as just a notch below Corvette.

Then, the winds of change again put a halt to the progress. As the economy slowed at the dawn of a new century, General Motors found that factory capacity levels were out of proportion to sales volume. Interest in Camaro and Firebird had slowed in favor of smaller, import roadsters. The Boisbriand plant in Canada, where both the Camaro and Firebird were produced, had become a financial drain on a once mighty General Motors. With the impending demise of certain GM brands, such as Oldsmobile and Saab, as well as talk of ending the Saturn, Hummer and even the Pontiac brands, there was little room for a halo sports coupe. It was decided that after 35 consecutive years of production, the Camaro and Firebird would be retired. In August of 2002, the final Camaro rolled off the production line. Shortly



thereafter the assembly plant was closed. Ford had won the Pony Car war of attrition.

However, you can't keep a good thing down. Just seven years after the exit of the Camaro, it came back to a market revived by the old Trans Am images of Mustang versus Challenger versus Camaro. All three nameplates were back in the showroom competing for new muscle car buyers.

The Trans Am effect had not only made the famous models relevant again, it severely spiked the values of consumer versions of the original Pony Car that ran on America's premiere road courses. Auction prices of 1967-69 Camaros have reached new heights. Likewise, the desire for 1970-71 'Cuda and Challenger models have put them into the upper echelon of American automotive royalty alongside the original Shelby Mustang GT-350.

This type of far-reaching influence never entered the minds of those who conceived the original Trans Am racing series. It was never a

thought that the fender-banging, paint-swapping and bumper-car action that was early Trans Am would have a lasting effect on the automotive industry and the enthusiasts that feed it. But, it has and can once again be purchased at dealers flying the Blue Oval, Bow Tie or Pentastar flag. **MD**



■ When it's all said and done, this is the Trans Am memory race enthusiasts cling to. Sure, the image is vintage, grainy and emotional, but so was the racing. It was a time that forever changed the automotive landscape.



■ As with the current Challenger and Camaro, the most modern Mustang harkens back to the old Trans Am, Pony Car days. So strong is the nostalgic pull that an incarnation of the Shelby GT-350 sold out before units were delivered to dealers.



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Everyone has a different version of the true American Dream. For some it's a successful business, for others it's the ideal home, still others find it in the magic of a muscle car. Simon Wehr found his dream as a teenager in the form of the classic Camaro while living in his native land of Australia. His first impression was at 14 when he saw a first generation RS/SS RS version. From that moment on he was hooked.

While the cool Aussie cars were the Holden variants from GM Australia, he was set on someday owning an American-made Camaro. When gen five Camaro photos were released in Australia, with an announced marketing plan to sell them there as the new Holden Commodore, he started planning exactly how he wanted his Camaro dream machine to look and perform. Then General Motors turned his dream into a potential nightmare when the once mighty industry giant filed for Chapter 11 bankruptcy protection. Simon feared his vision of a home-market, right-hand drive (RHD) Camaro would be killed as part of GM's bloodletting. The fire of desire for his American muscle car dreams was nearly doused, but a flicker of light remained.





# DOWN UNDER DREAMER

An Aussie-built, Strut-your-stuff Camaro

TEXT BY LOU LETO ■ PHOTOS BY HENRY DE KUYPER





He continued to believe he was meant to own a Camaro, and that he would find a way. His wife, ever supportive, bought him a Hot Wheels 1:64-scale Camaro in Inferno Orange, just to keep his spirits up and his dream alive. Simon never took it out of the package and told his son, “You can open this package when I buy the real thing.”

As Simon recalled, “Later, seizing upon an opportunity to take a job in the U.S., I began seriously looking for my dream Camaro. I decided to special order, so that the dream would become reality exactly the way I had always imagined.” Many option boxes were checked off on the factory order sheet, and the color, of course, was Inferno Orange. The other critical options were the SS and RS packages, followed by the Inferno Orange and Trim Accent packages.

Upon delivery, Simon came prepared for a special personal moment. “I had carried the Hot Wheels version, still in the factory package, with me. I presented it to my son, and said, ‘Now you can open it; it’s yours.’”

With the dream car now a reality, Simon’s efforts to finalize all of the important additional attributes began within the first two months of ownership. To more accurately control the Tremec TR-6060 six-speed manual transmission, the shifter was upgraded to a Hurst billet Competition Plus model.

Next, more power was in order. Simon had seen a Whipple supercharger on display while in Australia, and had long ago added that component to his mental wish list. “The car was only a few months old when I purchased a



“IT PROMPTED MANY OF THE GUYS ON MY BLOCK TO COME BY AND ASK, ‘WHAT ARE YOU DOING?’ ONCE THEY HEARD MY SUPERCHARGER ANSWER, THEY KEPT COMING AROUND TO WATCH THE PROGRESS. IT WAS A BIZARRE BONDING EXPERIENCE.”



■ Attached to the SS hood is a pair of Auto Meter gauges that monitor boost and air/fuel mixture. The mounting hardware was color matched and the connection points canceled.



Whipple supercharger. I did the installation myself in the garage. I was quite a spectacle in my new neighborhood. Here was this heavy-accented foreigner with a brand-new American muscle car, the entire front end stripped off, with me working on the car each evening. It prompted many of the guys on my block to come by and ask, ‘What are you doing?’ Once they heard my supercharger answer, they kept coming around to watch the progress. It was a bizarre bonding experience.”

While the Whipple had to come on and off a few times as Simon learned that he had to engineer a few changes to the installation, he admits, “I got pretty good at it.”

Later, a bad tune resulted in some lessons learned, along with three broken pistons. “After the engine soured, I went to Pfaff Racing Engines in Huntington Beach [California]. I knew that if Gordy Jennings, their engine builder, could assemble a marine racing engine that would last for hours at wide open throttle, he could build a bulletproof street engine. While I desired 1,000 horsepower, I agreed upon 800 for increased reliability.”

From reading online forums, Simon found that Ryne Cunningham was a brilliant tuner and had earned a reputation for suggesting improved injectors. Simon put Gary and Ryne together to figure out the best internals for the build that included forged pistons by Mahle with a 10:1 compression ratio. Pfaff treated the heads to a competition valve grind. The camshaft specifications were closely guarded, and the Comp Cam unit was modified by





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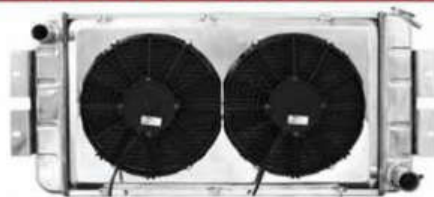


V8 mount pictured



6 Cyl mount pictured

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Shroud & Fan package pictured. Also available without shroud/fans.

**CAMARO**

'67-'92 CAMARO / Z-28



'69 427 Pictured

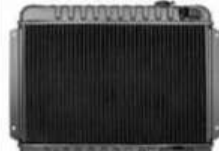
'67-'81 CAMARO



'67-'69 Pictured

**CHEVELLE**

'64-'71 CHEVELLE



'65 327 25" Pictured

'64-'88 CHEVELLE



'64-'67 25" Pictured

**BUICK**

'62-'76 SKYLARK / RIVIERA



'64-'71 Pictured

'64-'71 SKYLARK



'64-'67 Pictured

**IMPALA / FS CHEVY**

1958 - 1970



'64 409 Pictured

1959 - 1968



'61-'63 Pictured

**EARLY CHEVY**

1937 - 1954



'39 - '41 Pictured

1946 - 1954



'49-'54 Pictured

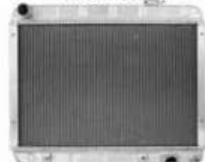
**CHEVY II / NOVA**

1962 - 1974



'66-'67 283/327 Pictured

1966 - 1974



'66-'67 327 Pictured

**DODGE / PLYMOUTH**

1966 - 1976



'66-'69 22" Pictured

1966 - 1969



'66-'67 26" Pictured

**MUSTANG**

1964 1/2 - 1993



'67-'69 20" Pictured

1965 - 1993



'68-'70 24" Pictured

**CHEVY TRUCK**

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'63-'66 24-3/4" Pictured

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'33-'34 Pictured

**FORD TRUCK**

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'48-'52 Flathead Pictured

1948 - 1956



'54-'56 Pictured

**OLDSMOBILE**

1964 - 1974



'68-'70 442 Pictured

1964 - 1971



'65-'71 28" Pictured

**PONTIAC**

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'64 24-3/4" Pictured

1961 - 1981



'66-'67 GTO Pictured

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Cunningham Motorsports of Murrieta, California. Manley H-beam-design connecting rods were chosen for added strength. The entire LS-3 (6.2L = 376-ci) engine was assembled with ARP bolts and studs. A Melling oil pump was tasked with supplying proper lubrication pressure. FIC 80-pound, billet-tipped injectors were installed to feed the fuel. The engine's crown was the Whipple 2.9-liter, twin-screw supercharger creating 12.7 pounds of boost.

To handle the spent gases, a Borla 3-inch stainless system was installed via XS 1 7/8 long tube



stainless four-into-one headers. "The mufflers were carefully selected so that I can actually talk in the vehicle at cruising speeds. It's a refined note, similar to a Maserati. No excess droning. When I step down on the accelerator, it completely changes to an aggressive and loud response," Simon noted.

After the engine build and installation, the Camaro spent another month with Cunningham for a customized final tune. The results were recorded by Simon's request. "I have a video of 782-plus horsepower on a 90-degree day. On 91-octane California pump gas. The car pulled so strong [680 ft-lbs of torque] that we had to sit on the trunk to keep the rear tires and wheels on the rollers."

Speaking of those big tires and wheels, the 22-inch Icon wheels by Strut were custom color-matched, 22x10 in the rear and 22x9 in the front. The Vredestein tires have a high-performance



■ Simon not only craved more hp, but dBs as well. A self-contained MTX Audio unit was wired into the trunk. It is designed to be removed during more competitive driving events.







■ There's a lot of street light surprise packed under this Camaro hood. A Whipple supercharger combined with Mahle pistons and a Comp Cam squeezes 800-hp from the 376-cid engine. Pfaff Racing Engines of Huntington Beach, CA engineered the build.



IN ITS CURRENT DREAM STATE, **THE CAMARO HAS BEEN ON DISPLAY AT THE SEMA SHOW AND SELECTED GOODGUYS EVENTS**, AND IT'S WON RECOGNITION AWARDS AT THE STREET MACHINE & MUSCLE CAR NATIONALS AND WAS AWARDED BEST NEW CAMARO AT THE CRUISE FOR A CURE.

compound made in the Netherlands, a selection that was based upon performance and traction characteristics that are shared by OEM-specification for many European exotics. The rear tire size is 295/30-22 and the front is 265/30-22.

In addition to the Strut wheels, this Inferno-themed Camaro does not hide the fact it can burn up the road in style. Strut components play a unique front-end styling role with a custom color-matched upper and lower grille collection. Suspension modifications include Eibach springs and Whiteline bushings. But, Simon may not be done yet. When asked about the items on his wish list, "If money were no object, I would like to beef up the stock IRS rearend with ZR1 half shafts. I'd also like bigger tires to help put the power to the ground."

In its current dream state, the Camaro has been on display at the SEMA Show and selected Goodguys events, and it's won recognition awards at the Street Machine & Muscle Car Nationals and was awarded Best New Camaro at the Cruise for a Cure.

Make no mistake, Simon believes in driving his dream, and please, don't ask if you can buy his exercise in aspiration. "I will pass it on to my son James," Simon says. To young James, it's an American muscle car dream version 2.0. **MD**



■ Strut Icon wheels were color matched and inserted into Vredestein tires, 295/30-22 back and 265/30-22 front. The performance stance and handling is via Eibach springs.



# Hard LAUNCH

## Blueprint for a Better High-performance Clutch

TEXT AND PHOTOS BY FREDDIE HEANEY



**Muscle car enthusiasts** who prefer a manual transmission might know whether their clutch release mechanism is operated by cable or by a hydraulic bearing, but if it's the latter, it's unlikely they could tell whether the bearing operates in constant contact with the clutch fingers or intermittently (i.e. operating only when the clutch pedal is depressed). More interestingly, what would lead a manufacturer of high-performance hydraulic clutch bearings to adopt one style over the other? Most will tell you the intermittent style offers a greater range of adjustment and it's quieter. It also eliminates the exhausting prospect of a constantly spinning bearing.

In a Columbia, South Carolina factory, Ram Clutches makes single- and dual-disc clutch sets that transmit from 400 to 1,300 hp. The company has also cultivated a fine reputation for the

production of hydraulic clutch release bearings. These operate on both single- and dual-disc clutches and function only when the clutch pedal is depressed. Tim Matherley, the acclaimed NMRA Real Street Mustang racer says, "The regular hydraulic release bearings that run constantly have a tendency to chirp. But on the higher horsepower cars, if you're looking for quality, Ram has the best option, and they're quiet."

High-performance release bearings that operate only when

the clutch pedal is depressed have 0.800 inch of potential travel. More importantly, they should be positioned with the correct gap when the pedal is not depressed (the gap between the contact face of the release bearing and the clutch fingers). Excessive gap causes improper release; inadequate gap can cause the bearing to over-travel and collide with the snap ring or cause slippage as the clutch wears and the fingers move back, making contact with the bearing.





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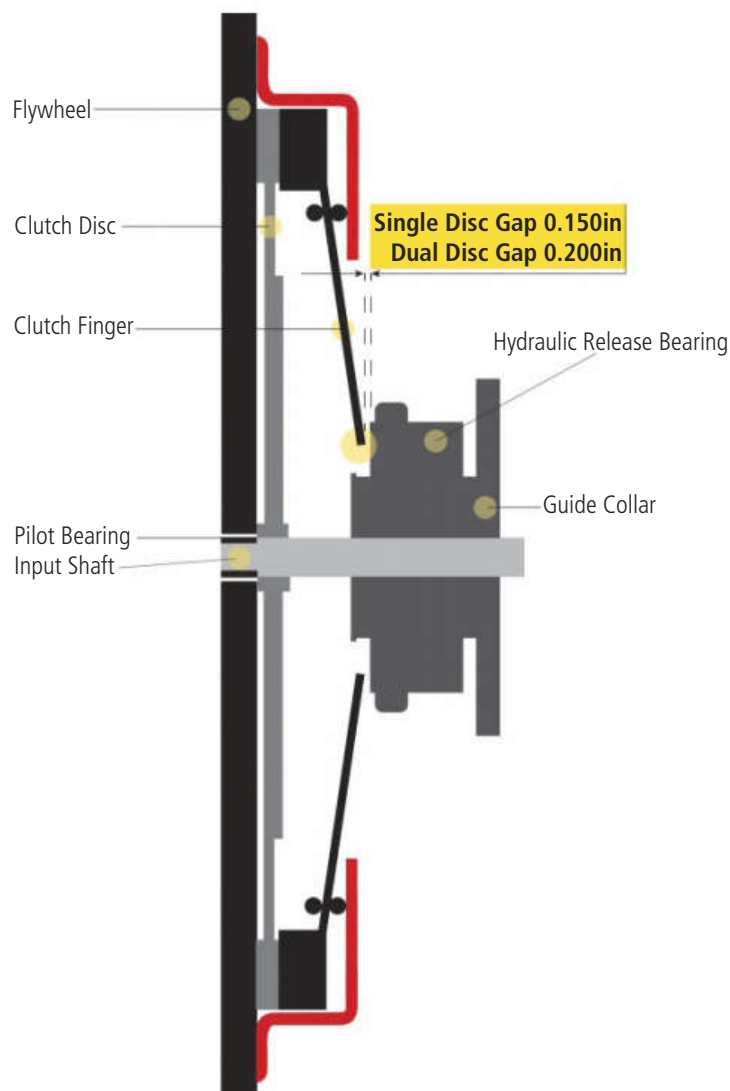
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Single-disc clutches operate best with a gap of 0.150 inch, while dual-disc sets require a gap of around 0.200 inch. Because the clutch fingers automatically travel toward the release bearing as the friction disc(s) wear, an additional clearance of 0.050 inch is assigned to the dual-disc arrangement.

That's all well and good, but how do you know when they're operating with the correct gap? As we know, the entire clutch mechanism is concealed within the bell housing and therefore not visible. Read on to see how it's accomplished. **MD**



**01** First, install the fittings in the bearing housing. The best way to seal the fittings is by applying Teflon tape to the male threads. Do not use liquid sealants as they will leak. Then install the fittings in the bearing housing, using a  $\frac{1}{8}$ -inch wrench to tighten them.



**02** Use Teflon on the two-piece bleed fitting. The bleeder line, which is the shorter of the two lines fitted to the bearing housing, will be installed on the top port of the housing to ensure efficient bleeding.



**03** To establish the correct longitudinal position of the release bearing on the input shaft, three measurements are required. The first measurement represents the distance between the crankshaft flange and the rear machined face of the engine block.

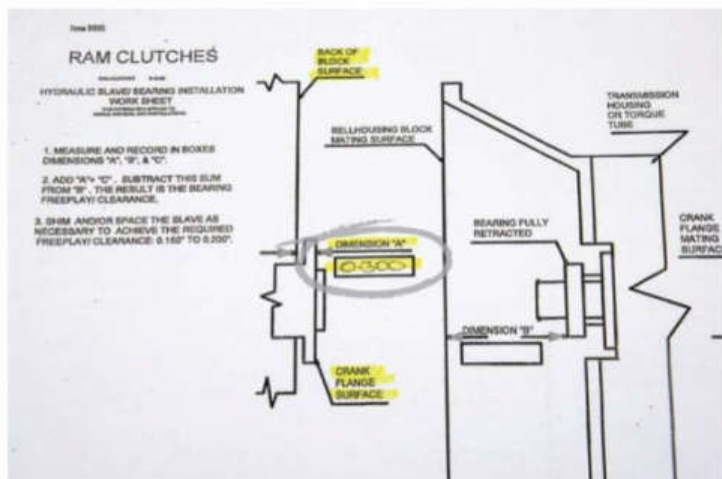


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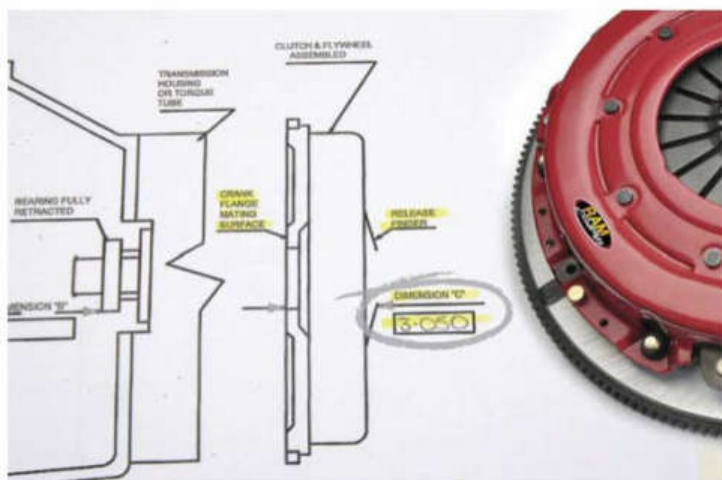




**04** Subtract the thickness of the straight bar and record the resulting dimension (0.300 inch) on the Ram instruction sheet.



**05** The second measurement establishes the height of the clutch. First, ensure the clutch is fully bolted-down to the flywheel. A straight bar is laid across the clutch fingers and measured down through the fingers and center hub of the disc to the back flange of the flywheel. If the back flange of the flywheel is recessed, set it on a pedestal to obtain a true measurement.



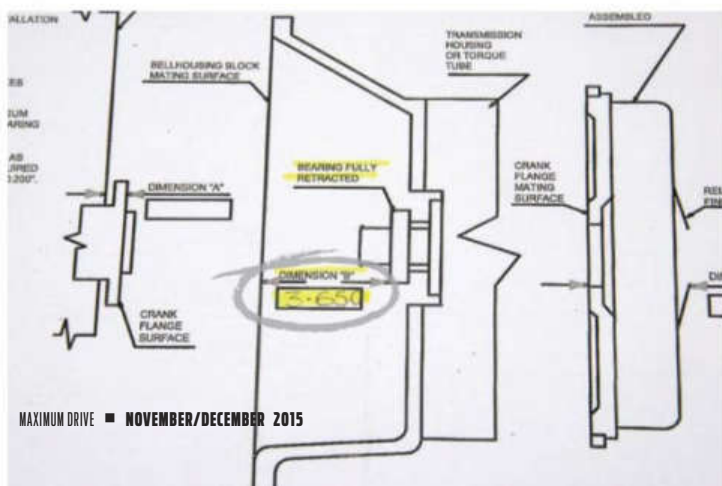
**06** Remember to deduct the thickness of the straight bar and record the clutch height dimension (3.050 inches) on the set-up diagram.



**07** Install the stud on the guide collar and secure the guide collar to the bell housing. The stud prevents the bearing from rotating. Then slide the bearing over the collar to establish the third measurement, which is the dimension from the face of the hydraulic release bearing and the bell housing mounting flange.

**08** Remember to deduct the thickness of the straight bar and record the amount (3.650 inches). To calculate the third measurement, simply add dimensions A (0.300 inch) and C (3.050 inches) and subtract this sum from dimension B, which indicates that the bearing, when fully retracted, is positioned 0.300 inch from the clutch fingers.

**09** Typically, Ram aims for a 0.200-inch gap on dual-disc and 0.150 inch on single-disc installations. To reduce the bearing gap, remove the bearing and place the appropriate amount of cone-shaped shims behind it. Some of the shims provided measure approximately 0.100 inch, others measure 0.045 inch.





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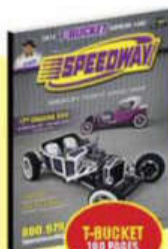
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**10** Finally, place the straight bar across the bell housing flange and remeasure. If the gap is acceptable, install the hydraulic lines: The bleeder fitting resides on the top line; the remaining line routes to the master cylinder.



**11** Next, check the length of the drive stud with the bearing fully extended. The stud must not come in contact with the clutch cover. Push the bearing out to its full extension and fit it back on the stud with the appropriate shims beneath it. If the stud protrudes through the bearing housing and threatens contact with clutch cover, shorten the drive stud.



**12** Finally, there's good reason to consider inserting a Ram pedal adjuster in the hydraulic line just before the master cylinder. Hydraulic bearings often engage high on the travel stroke of the clutch pedal, which is uncomfortable. Conveniently, this pedal adjuster enables you to place the pedal mid-travel or, in fact, any clutch engagement position you'd prefer. Usually, the pedal adjuster mounts on the firewall or fender well.

#### SOURCES

**Ram Clutches**  
201 Business Park Blvd.  
Columbia, SC 29203  
803.788.6034  
[Ramclutches.com](http://Ramclutches.com)

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# MUSCLE CAR

## MATH:

The Formula for Lower Elapsed Time

■ BY ALAN PARADISE

The ground shakes, the eyes burn from the expended fuel, the ears ring from unfettered exhaust—what a rush of adrenaline and emotion. As muscle car enthusiasts, we are by nature drawn to and in awe of massive horsepower. Who can resist the unmistakable whining sound of a blower competing for audible attention with a gear drive coming from a big-block SOHC Ford, Chevy Rat motor or Chrysler Elephant engine in a modified coupe, hardtop or Pony car? Or maybe we just as much fancy a small-block Chevy or Ford with a tunnel ram fitted with twin four-barrels?

# Power to Weight to Pavement

■ Optimizing horsepower often requires a balance of power to weight to traction. The formula can be quite different for each vehicle depending on purpose, suspension enhancements and combination of driveline components.







Major league power can be both exhilarating and intimidating. However, performance is not always about shoehorning the most horsepower under the hood. Weight and suspension play very important parts in bringing an engine's maximum performance to fruition. This is why a Vega transplanted with an LT-1 350 with two 600-Holleys on a tunnel ram and 4.56:1 gears can often put the hurt on a GTX with a cross-ram intake on a 440 running a 4.10 rear. Despite giving up 90-ci and likely 100-hp, the Vega is slimmed down to move 1,000 pounds less weight while gaining the advantage into and staying in the power band to optimize the engine's potential. The key factors of power to weight, weight transference and selective gearing help make horsepower work for you.

It's amazing how putting a car on a diet can result in improved overall performance. The easy way to relate weight to horsepower gain is to first calculate your car's weight-to-power

■ Fitted with a Max Wedge, this Pro Street '64 Dodge Polara looks like it could use a great deal of weight reduction. However, in stock trim, this model scaled in at only 3,300 pounds. It didn't take much to drop 500 pounds and build the engine to 725 hp. The result were consistent E.T.s of 9.90 at 136 mph.

ratio. For example, a '69 Camaro SS weights in at 3,480 pounds. With the factory issued 350-hp engine, that's 9.94 pounds per horsepower. With a mild amount of aftermarket additions, for argument, let's push the raw output to 375-hp. Each horsepower is now responsible for carrying 9.28 pounds. Now comes the million-dollar question: How much faster in the quarter-mile has this Camaro become? Answer (with all conditions and skills being equal): about four one-hundredths of a second. In other words, not much. Now, if we take the same Camaro, replace the 34-pound steel hood with an 18-pound fiberglass or carbon-fiber hood and remove the rear seat (27 pounds), we've just saved 45 pounds of engine labor, or roughly seven one-hundredths of a second.

Okay, where do we go from here? The big weight mongers are those awesome-looking factory rally wheels. The average 15x7 rally wheel tips the scale, with beauty ring and center cap, at 26 pounds. If we opted for 15x8s on the rear, each weighs in at 29.5 pounds. Replacing the steel rally wheels with aftermarket aluminum can really make a big difference. Using a popular Centerline application, for example, can save 14.25 pounds per 15x7 and 16.5 pounds per 15x8. Installing aftermarket aluminum wheels trimmed more than 61 pounds of fat. Add that to



■ Factory steel wheels, even the coolest ones, are remarkably heavy in comparison to aftermarket aluminum wheels. For example, replacing the factory GM rally wheels can save as much as 65 pounds.



the total and we reduced the engine load by 106.5 pounds. That takes about a .20 off the E.T. Now, let's say we focused on additional performance and did nothing else to reduce weight, such as swapping in a foam-filler fuel cell, acid-dipping the front fenders and going on the Atkins Diet. For the next additional 25-hp gained, the E.T. would be cut by an additional .10 of a second. The numbers extrapolate from that point as each horsepower gain reduces the weight each is tasked with moving. Now, every ounce begins to count: headers over cast exhaust, performance heads over factory cast iron, etc.

Getting power to the pavement is essential. After all, adding horsepower and cutting weight means nothing if you can't get the drive axles to hook up. This is where the right suspension package and chassis modifications come into play. The Gasser era came about to keep weight transferred to the rear under extreme acceleration. The front suspension offered virtually no handling capabilities. The straight axle often used leaf springs with little or no shock travel. And let's not even get into lack of steering geometry. While it looked darn cool and did work to some small extent, it was soon discovered that the increased wind resistance and need to manhandle the car down even the smoothest of drag strips (let alone a city street) was not an equal tradeoff for a few tenths in E.T. This led to the ass-end-up formula.

■ Replacing steel body components can also be an excellent way to put your car on a diet. Fiberglass or carbon fiber hoods, trunk lids and fenders are available for most popular muscle cars, such as this '69 Camaro hood that trims 16 pounds from stock.

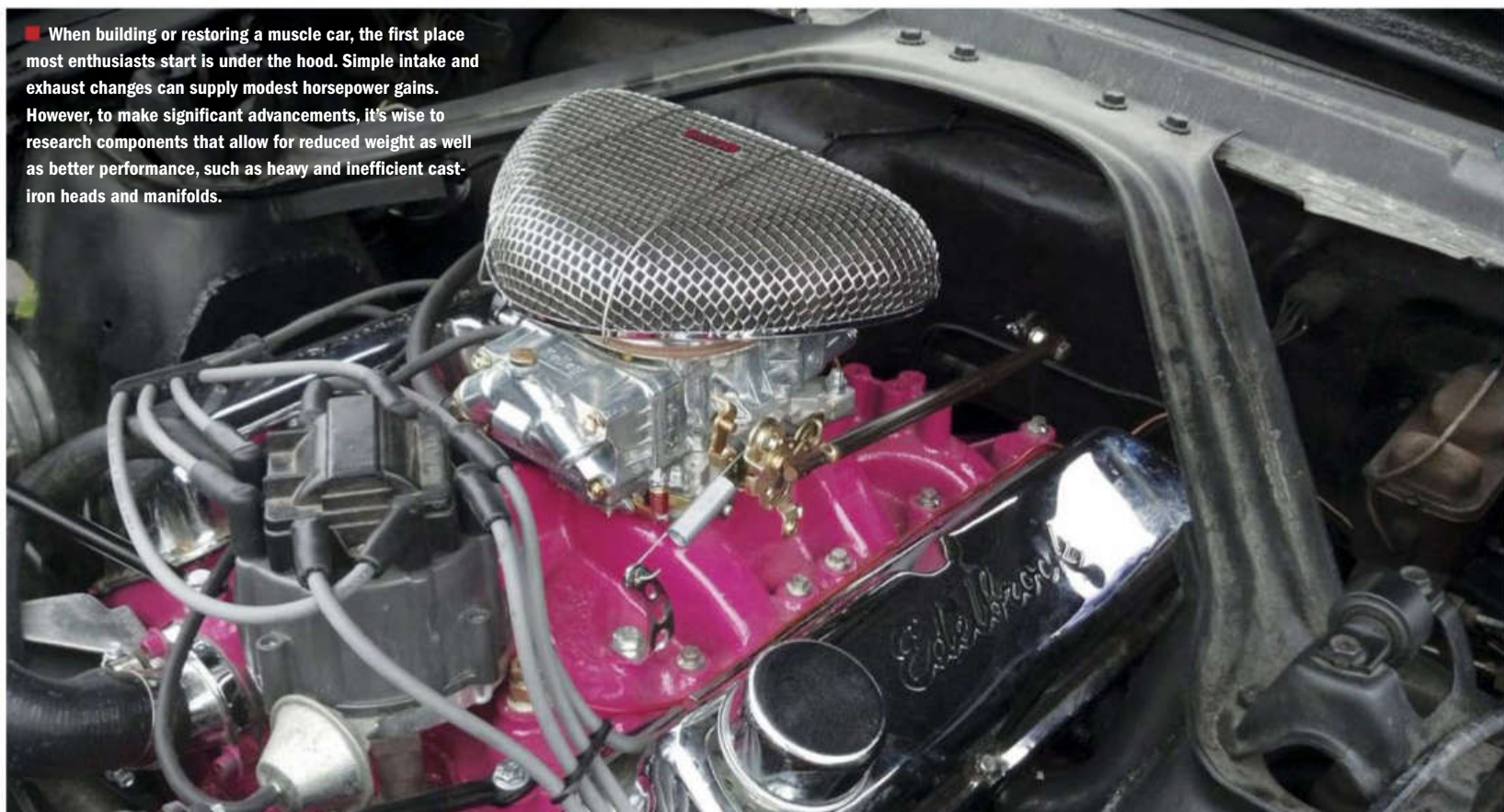


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TODAY, MORE SOPHISTICATED TECHNOLOGY AND COMPUTER-ENRICHED RESEARCH AND DEVELOPMENT TEAMS HAVE **ENGINEERED SUSPENSION PRODUCTS AND TIRE TECHNOLOGY THAT HELP VINTAGE AND CONTEMPORARY MUSCLE CARS ACHIEVE GREATER PERFORMANCE.**

---

■ When building or restoring a muscle car, the first place most enthusiasts start is under the hood. Simple intake and exhaust changes can supply modest horsepower gains. However, to make significant advancements, it's wise to research components that allow for reduced weight as well as better performance, such as heavy and inefficient cast-iron heads and manifolds.





More commonly referred to on the street as “the stinkbug look,” it became popular in the late-’60s and into the ’70s. It was also believed to help keep weight pushed back and held over the rear wheels under acceleration; this was often accomplished by adding air shocks to the rear combined with traction bars that limited the rotation of the solid rear axle housing under load. However, with standard front suspension springs and shocks, the lift and fall were nearly as quick, thus expending too much energy as the car made each gear change. This also hampered handling, and at times, caused the front to wobble at the bottom end of the power band. This is where the idea of 90/10 shocks and progressive rate coil springs came into play. These front suspension components helped transfer weight from the front and slowly redistributed to the front wheels with each shift change.

This didn’t last long either, as experienced chassis builders knew the secret to applying proper traction was in the relationship between suspension travel and damping resistance times tire surface and compound tempered with air pressures.

Today, more sophisticated technology and computer-enriched research and development teams have engineered suspension products and tire technology that help vintage and contemporary muscle cars achieve greater performance.

One such product is Eibach Springs’ Drag Launch Kit. The American division of this global automotive aftermarket company offers packages designed for popular Mustang and Camaro chassis, including special front coil springs that quickly transfer weight to the rear coil springs. The rear springs are designed to plant the rear tires to provide greater traction off the starting line and reduce the possibility of tire spin. A specially designed air bladder offers adjustable control over suspension twist, giving the driver improved control.

All of these suspension gymnastics mean nothing without knowledge of the power-to-weight relationship. What makes a car quick is different from what makes it fast. A quick car has a favorable power-to-weight ratio combined with proper drive gear ratios.

The subject of gear ratios brings to the table a very important question: how to determine the correct gear ratio for quarter- and eighth-mile performance? The final drive ratio of more street-driven cars is too high to maximize short distance E.T. and mile-per-hour speed. While this makes each an outstanding road vehicle, it’s also impossible for a vehicle to take full advantage of its capable horsepower between points A and B.

So, how do you determine the correct gear ratio for short run needs?

**The formula for manual transmission models is:**

$$\text{Overall Gear Ratio} = \frac{\text{tire diameter} \times \text{rpm}}{340 \times \text{mph}}$$

**For automatic transmissions the formula is only slightly different:**

$$\text{Overall Gear Ratio} = \frac{\text{tire diameter} \times \text{rpm}}{335 \times \text{mph}}$$

Correctly geared, your vehicle can trip the end lights at the peak of the power curve, putting down its optimum power throughout the run. Gear ratio becomes important because gearing too low will reach peak power before the end lights and gearing that is too high will still have the engine power on the rise after the end lights have been tripped.

To illustrate this point, a Ford F-150 Lightning, appropriately one of the fastest factory vehicles prior to 2013, with a 7,200-rpm redline using 29-inch rear tires may need an FDR (final drive ratio) of 5.41 to achieve a 120-mph quarter-mile time. That’s some very stout gearing. In contrast, with factory tire size (28.45 inches) at 6,000 rpm redline, to reach 103 mph, the FDR would be 4.94. At 5,200 rpm the FDR is 4.12.

We could print thousands of potential power/weight/gear ratio combinations. However, all things being equal, here is a quick reference chart for determining power to weight in quarter-mile elapsed time.

	ELAPSED TIME									
HORSEPOWER	250	275	300	350	375	400	450	500	550	600
WEIGHT										
1,500	10.58	10.25	9.96	9.46	9.25	9.05	8.70	8.40	8.14	7.91
2,000	11.65	11.29	10.95	10.41	10.18	9.96	9.58	9.25	8.96	8.70
2,500	12.55	12.16	11.81	11.22	10.95	10.73	10.32	9.96	9.65	9.37
3,000	13.34	12.92	12.55	11.92	11.65	11.40	10.96	10.58	10.25	9.96
3,500	14.04	13.60	13.21	12.55	12.26	12.00	11.54	11.14	10.79	10.49
4,000	14.68	14.22	13.81	12.12	12.82	12.55	11.54	11.29	11.07	10.86

	MILE PER HOUR									
HORSEPOWER	250	275	300	350	375	400	450	500	550	600
WEIGHT										
1,500	128.8	132.9	136.8	144.1	147.4	150.6	156.6	162.2	167.5	172.4
2,000	117.0	120.8	124.3	130.9	133.9	136.8	142.3	147.4	152.2	156.6
2,500	108.6	112.1	115.4	121.5	124.3	127.0	132.1	136.8	141.3	145.5
3,000	102.2	105.5	108.6	114.3	117.0	119.5	124.3	128.8	132.9	136.8
3,500	97.1	100.2	103.2	108.6	111.1	113.6	118.1	122.3	126.3	130.0
4,000	92.9	95.9	98.7	103.9	106.3	108.6	113.0	117.0	120.8	124.3

■ Aluminum heads that offer improved intake and exhaust flow serve the dual purpose of trimming weight and boosting performance. This is, however, not an inexpensive upgrade. Often it's just as important to trim the amount of weight each horsepower must carry as opposed to just adding potential power.







■ This looks intimidating and impressive, but finding the balance for running from point A to point B requires less rubber left on the pavement. Finding that balance is all in the math. And you thought you'd never use high school algebra.

The final aspect of this equation is rear tire circumference. Tire size is a huge factor in determining proper or necessary final drive ratio needed for the combination of driving you're asking your car to perform.

Reading tires can be like learning a foreign language. A combination of numbers and letters separated by slash marks augmented with DOT ratings. For street-purpose tires, here's a simplified breakdown: Going back to our '69 Camaro as an example, the stock tire could have originally been called an F-60x15. In more modern terms, this is a 205/60/15. In some cases it could read P205/60/15. If that sounds Greek to you, here's the translation: The "P" indicates that the tire's size measured in metric by the width. So, 205 millimeters of tread width. The "70" is the percentage of sidewall, or tire height, in relation to the tread width. Tire height is not measured by the overall diameter of the tire, but the measurement from the top edge of the wheel to the top edge of the sidewall, in this case 143.5 millimeters. This measurement exists on both the top and bottom of the tire so multiply it by two coming up with 287 millimeters. Convert millimeters to inches by multiplying by 0.03937 to equal 11.3 inches. Add this to the wheel size of 15 inches to find the overall diameter of 26.3 inches. If this were a lower profile tire,

say a 205/60/15, the tire height would be 60% of the tread width, or 136.66 millimeters, changing the overall size of the tire to 25.76 inches.

Track tires, especially rear tires, are often taller than the factory issued or aftermarket street performance applications. Track tires have the overall diameter as part of the sidewall specification, such as 15x33 is 33 inches tall made to fit a 15-inch wheel. This is very important because the overall tire diameter plays a major role in determining the final drive ratio.

Getting back to our hypothetical Camaro, it has 375 hp, the weight is 3,200 pounds, running 4.11 gears and 30-inch rear tires. So, what can we expect it to run in the quarter-mile? Taking into account an approximately 17% loss in energy as power runs

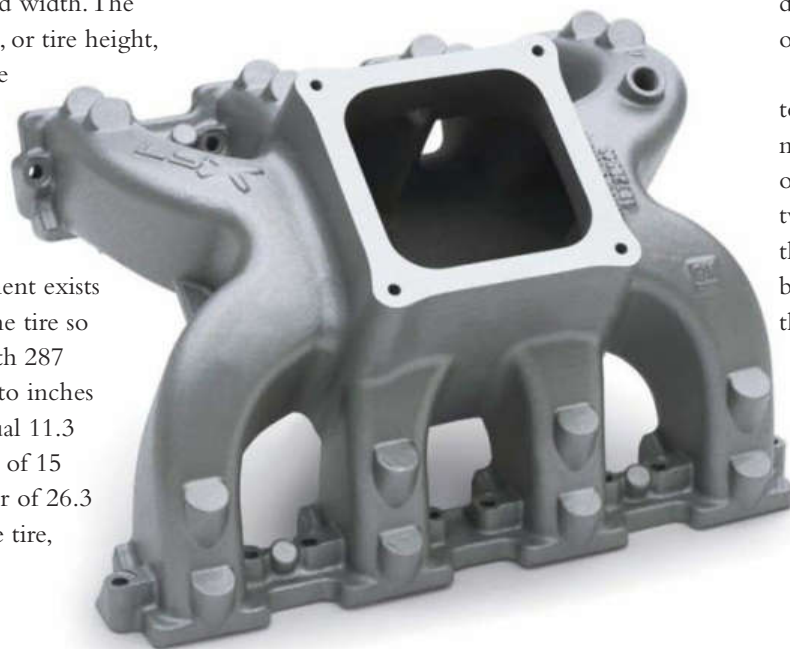


■ Throughout the decades, many muscle car owners have elected to run automatic transmissions over traditional four-speeds. This can be effective on the strip, but there is a cost in terms of weight and additional energy loss. On average, an automatic transmission robs an additional 18-25-hp over a manual transmission.

through the M-22 four-speed transmission, turns the driveshaft and rear axles, this could mean, under optimum conditions, our Camaro should trip the lights in 13.35 seconds with a top speed of 112.75 mph.

This is very respectable for a dual-purpose (street and strip) muscle car. If we were to strip the car down for track, only use 2,800 pounds and pump up the horsepower to 500, the times could drop to about 11.5 at 123 mph. However, lost would be the joy of having the option of driving the quick little Camaro on the street.

In the end, it all comes down to what you want out of your muscle car: street, strip or show, or perhaps a combination of two or all three. Either way, the excitement of driving is being able to get the ponies to the pavement. **MD**



■ Performance aluminum intake manifolds have become a commodity upgrade. These aftermarket items represent one of the most cost-effective horsepower upgrades.



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New ratchet crimp tool set includes five crimp dies for the most common terminal types. Ratcheting mechanism makes uniform precision crimps every time.



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## SCAT PACK PERFORMANCE

**T**he Mopar Scat Pack 3 Performance Kit is specifically tailored for the competitive enthusiast looking for extreme performance and ultimate bragging rights.

As the final building block in the 5.7L Scat Pack family, Scat Pack 3 puts the finishing touches on gains realized by Scat Pack 1 and 2. With the addition of new Mopar Performance CNC-ported cylinder heads, Mopar high-flow manifolds and high-flow catalysts, drivers will reap the benefits of up to 75 more horsepower and 44 lb-ft of torque with this made-for-the-track upgrade.

The performance upgrade kit also includes a gasket set, exhaust manifolds, exhaust adapter, mounting brackets, hardware and two Scat Pack 3 badges.

Like Scat Pack 2, the Scat Pack 3 kit boosts performance while maintaining the factory warranty.

The Scat Pack 3 for 2011-15 Dodge Challenger and Dodge Charger vehicles is now available for an MSRP of \$4,495 through an authorized dealership.

Installation of the Scat Pack 2 and Scat Pack 3 kits requires a revised calibration provided by Arrow Racing.

Mopar parts are engineered together with the same teams that create factory-authorized specifications for FCA vehicles. This offers a direct connection that no other aftermarket parts company can provide. A complete list of Mopar accessories and performance parts is available at [Mopar.com](http://Mopar.com).

## STANG BRITCHES

**C**alTrend offers custom-tailored seat covers for the '15 Ford Mustang coupe and convertible models. Manufactured in the U.S.A., CalTrend offers these new covers in a choice of materials. The "I can't believe it's not leather" is a luxurious top-quality material with the look and feel of real leather. DuraPlus is a canvas-like, high-abrasion-resistant fabric. Neoprene and NeoSupreme are created from a wetsuit-like material with a rich, sporty appearance. New for 2015, Tough Camo is rugged and stain, water and abrasion-resistant with a camouflage pattern.

CalTrend custom seat covers are side airbag compatible, feature large seat-back pockets to store personal items and include reinforced seams and cushioned foam lamination that provides a soft and comfortable feel for a perfect fit.

All include a two-year manufacturer's warranty. For more information on colors and fabrics available, contact CalTrend at 2121 S. Anne St. Santa Ana, CA 92704; 800.846.8621 or [Caltrend.com](http://Caltrend.com).



## SUPER SHAFT

**S**trange Engineering now offers SFI-certified chome-moly driveshaft assemblies. Each 3- and 3.5-inch shaft is built with seamless chome-moly tubing, TIG welded, straightened and balanced to deliver straight reliability under the most demanding conditions. Options include 1350 or 1480 series weld ends and U-joints.

Strange Engineering also offers a full line of chome-moly transmission yokes to complete the driveline assembly. Log on to [Strangeengineering.net](http://Strangeengineering.net) for details.



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## SUPER BOOST

**L**ingenfelter's new Stage 1 LT-4 kit offers a boost in horsepower and torque across the entire power band, providing a noticeable difference in acceleration. The high-performance icon also reports that throttle response is greatly improved, with the LT-4 now responding instantly to pedal input. The result is a Z06 Corvette that feels more like a race car on a road course, yet with the manners and temperament of a car that can easily be driven comfortably daily on the street. For more information, contact Lingenfelter Performance Engineering, 7819 Lochlin Drive, Brighton, MI 48116; 260.724.2552 or [Lingenfelter.com](http://Lingenfelter.com).



## STRANGE SHOCKS

**S**trange Engineering aluminum bolt-in shocks are based on the proven coil-over technology that has been used by racers for years. The lightweight aluminum construction makes tuning the suspension easy by locating the adjuster knob(s) at the bottom of the shock body. The wide range of damping allows each shock to be used in street, strip and road race applications. Each includes high quality mounting hardware to handle most applications.

Strange Engineering aluminum-bodied, bolt-in shocks are available for popular American muscle cars. Available in both single and double adjustable configurations, these shocks can also be customized to specific lengths, strokes and valve settings. Single adjustable shocks start at \$150, and double adjustable shocks start at \$250. Log on to [Strangeengineering.net](http://Strangeengineering.net) for more information.



## MAXIMUM BRAID

**S**now Performance now offers braided stainless hose for its Boost Cooler water/methanol-injection systems. The hose is a synthetic methanol-proof EPDM hose that is braided with stainless steel capable of withstanding as high as 1,250 psi.

The hoses are pre-cut for each application, making for easy installation that also enhances the engine compartment. "Braided tubing is the standard for fluid systems in high-performance applications," says Matt Snow, president of Snow Performance. "In recognition of this, we have produced this hose upgrade in custom lengths for all Boost Cooler systems."

Snow Performance claims that Boost Cooler water/methanol systems increase air density in the combustion chamber, allowing more timing and boost in power. Snow Performance has been designing and manufacturing water/methanol-injection systems for more than a decade. For more information, contact Snow Performance, 1017-A, East Hwy 24, Woodland Park, CO 80863; 760.674.5876 or [Snowperformance.net](http://Snowperformance.net).





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# 2016 DODGE VIPER ACR

Track Tested, Street Approved

TEXT BY AARON SMITH ■ PHOTOS BY SRT





All previous Dodge Viper ACRs have been fast. Not the kind of fast that astounds your friends after you press the “Ludicrous” mode button. No, this is the kind of fast that sets new records at the Nürburgring; the ones that have remained in the Top 10 quickest laps for a street legal production car for more than five years. The kind of fast that gets the attention of elite supercar makers like Lamborghini, Ferrari and Porsche. With that kind of fast to live up to, what does Dodge do to push the envelope? It makes the 2016 edition of the Dodge Viper ACR even faster. This isn’t a street car for the track; it’s a race car you can drive on the street.

■ Massive Brembo carbon ceramic matrix brake rotors with multi-piston calipers slow the speedy ACR. The track/street two-seater sports 15.4-inch rotors with six-piston calipers up front and 14.2-inch rotors with four-piston calipers in the rear.



■ The ACR suspension features Hyperco progressive rate springs with a front rate of 600 pounds and a rear of 1,300 pounds. Bilstein shocks offer 10-way adjustability for compression, and rebound spring perches have 3 inches of height adjustment to allow you to dial in the suspension for nearly all track or street conditions.

If you have any doubts that the '16 Dodge Viper ACR is serious about performance, just take a look at the 295-width special compound tires wrapped around 19-inch wheels. Walk around back and look at the rear tires. That's right, the ACR's front tires are wider than the rear tires on the new BMW M4. To get all 645 horsepower and 600 lb-ft of torque from the massive 8.4 LV-10 engine to the ground, the rear wheels are shod in 355-width tires. Those Kumho Ecsta V720 tires are specifically designed for this Viper ACR and feature a custom tread pattern and compound that's unique front to rear. Dodge claims the new street legal tires shaved 1.5 seconds per lap during testing when compared to full race compound tires.

Clearly it seems that with the Dodge Viper ACR more is more. That is until you look at the creature





comforts. To reduce weight, the padding is removed from under the carpet, the seats are manually adjustable, and nine of the 12 speakers have been removed. But then again, whoever bought a Viper for creature comforts? However, if you'd like to customize your Viper ACR, Dodge offers the "1 of 1" program which allows you to custom order a combination of seven aero packages, 11 different wheels, three brake packages, four suspension options, 8,000 paint colors or stripes of virtually any color to ensure that your ACR is one-of-a-kind.

The cockpit isn't a bad place to be. The dash is wrapped in Alcantara, and all of the usual buttons and switches are present. This isn't a fully

■ **The front splitter is also engineered to be the counterbalance to the rear wing as it stabilizes the nose during high speed, something easily achieved in the Viper ACR.**

stripped race car with a giant kill switch and some aluminum covering the airbag holes. This is a car that could passably be driven on the street, just not during your bumper-to-bumper, suburban-to-urban commute. Pop open the rear hatch though and you'll find the trunk area stripped of any insulation or carpeting. You can see the access cover for the fuel pump and the ductwork to cool the rear brakes.

The goal with the ACR version was to design the most performance-oriented Viper ever built. The engineers didn't want this to just be a hopped-up street car for turning a few hot laps at

an open track day. They wanted this car to be competitively raced on road courses around the world, so everything is designed for lap after lap of driving at the limit.

Brakes often take the most punishment at the track, so the ACR features Brembo carbon ceramic matrix brakes that sport 15.4-inch rotors with six-piston calipers up front and 14.2-inch rotors with four-piston calipers in the rear. These monster brakes not only reduce weight, but also allow for repetitive hard braking without a hint of fade. Removable air ducts feed cool air to the rotors to help hasten heat dissipation.

Modern performance cars do a lot of the thinking for the driver and make the average





driver look like a hero while often getting in the way of those who know what they're doing. While the '16 Dodge Viper ACR features ABS and a five-mode electronic stability program, going fast while staying out of the tire wall is still left up to the driver and requires a high degree of talent. That same driver needs to work three pedals and row a gear lever to get the most out of the engine with the Tremec TR6060 six-speed transmission. No floppy paddle gearbox here.

Keeping the massive tires glued to the asphalt is the job of both the suspension and the aerodynamics. Starting with the suspension, the ACR features coil-over Bilstein racing shocks with 10-way adjustability for both compression and rebound. The spring perches feature 3 inches of height adjustment to allow for precise height and corner weight adjustments. Front and rear spring rates are 600 lbs-in and 1,300 lbs-in respectively. That's more than double the stiffness of the standard Viper TA model.

Looking at the rear wing of the Viper ACR my first thought was that rearward vision would be completely blocked, but in the immortal words of Raúl Juliá in *Gumball Rally*, "What's-a behind me is not important!" Fortunately, the Viper ACR's rear wing sits up so high that you actually look under it, so you'll be able to enjoy the view of the competition shrinking in the rearview mirror.

The wing isn't just for appearance. The adjustable carbon-fiber, dual-element wing (referred to as the X-wing by Dodge) along with the



**PRESS THE ENGINE START BUTTON AND THE ACR SPRINGS TO LIFE WITH AN EXHAUST NOTE THAT ONLY A LARGE DISPLACEMENT V-10 CAN REPLICATE. THERE'S NO NEED TO PIPE IN FAKE EXHAUST SOUNDS VIA THE STEREO SYSTEM HERE.**

adjustable rear carbon fiber diffuser, removable hood louvers, four dive planes and removable front splitter (handy when pulling into steep driveways), produce more than a ton of downforce at 177 mph. Combining the aero package, racing suspension and ACR-specific tires makes for monstrous grip. Dodge claims a sustained 1.5 g in high-speed turns. The Dodge boys also tell us that they have to sell the car with the standard three-point seat belt, but they've included all the provisions to easily bolt in a six-point harness. At 1.5 g, you'll need it.





■ The fully adjustable X-Wing stands so tall you actually look under it via the rear view mirror. Its carbon fiber construction makes it an ultra lightweight aerodynamic component that throws ideal downforce on the tail structure.



■ This is what the Viper ACR was built for: to flog around corners and blast the straights. Note the huge footprint laid down by the Kumho Ecsta tires. Yes, the front tread is wider than that offered on a BMW M4.

Press the engine start button and the ACR springs to life with an exhaust note that only a large displacement V-10 can replicate. There's no need to pipe in fake exhaust sounds via the stereo system here. With a cockpit that's lacking the normal sound deadening of a standard Viper and side exit exhaust pipes, you have an amazing soundtrack sans the artificial acoustics.

The Viper ACR produces the most torque of any naturally aspirated production engine and a quick blast through the gears reminded us of the old adage that there's no replacement for displacement. Acceleration was breathtaking in any gear and power was delivered in a linear and unrelenting fashion. With the recent trend toward

turbocharging, we should all cherish what may be the last generation of unboosted engines.

Despite lacking many of the electronic nannies that turn the driving experience of some exotics into a video game, the Viper ACR has so much grip that you really have to do your worst to get it out of shape. The genius of this car is that how it handles is within your control. Make some aero adjustments, change the shock settings, tweak the alignment and you can dramatically change the behavior of this car.

With a base price of \$122,490, the '16 Dodge Viper ACR may just be the most race car you can buy for the money. Plus it's street legal, so just think of the money you'll save on a tow vehicle and trailer. If you're serious about driving at the track and want something that will really turn heads on the street, the '16 Dodge Viper ACR is your ticket; all for less than the cost of a Porsche 911 Turbo and at least half the cost of anything with a prancing horse or charging bull emblem on the nose. **MD**

■ The interior may look like it offers plenty of creature comforts but that's an illusion. All unnecessary items have been jettisoned in favor of reducing weight.





# The Wally Parks NHRA Motorsports Museum's New Gallery

Setting Top Speed  
and Low E.T. for  
Motorsports Museums

TEXT BY D. M. SMITH

■ PHOTOS BY JIM WHITE

The Wally Parks NHRA Motorsports Museum presented by Automobile Club of Southern California recently opened its new interactive exhibit hall, the Gallery of Speed, which brings to life significant moments in American motorsports and car culture.

The Gallery of Speed allows you to step back to the humble beginnings of the NHRA and experience how hot rodding and motorsports have touched our lives through innovation, engineering and design.

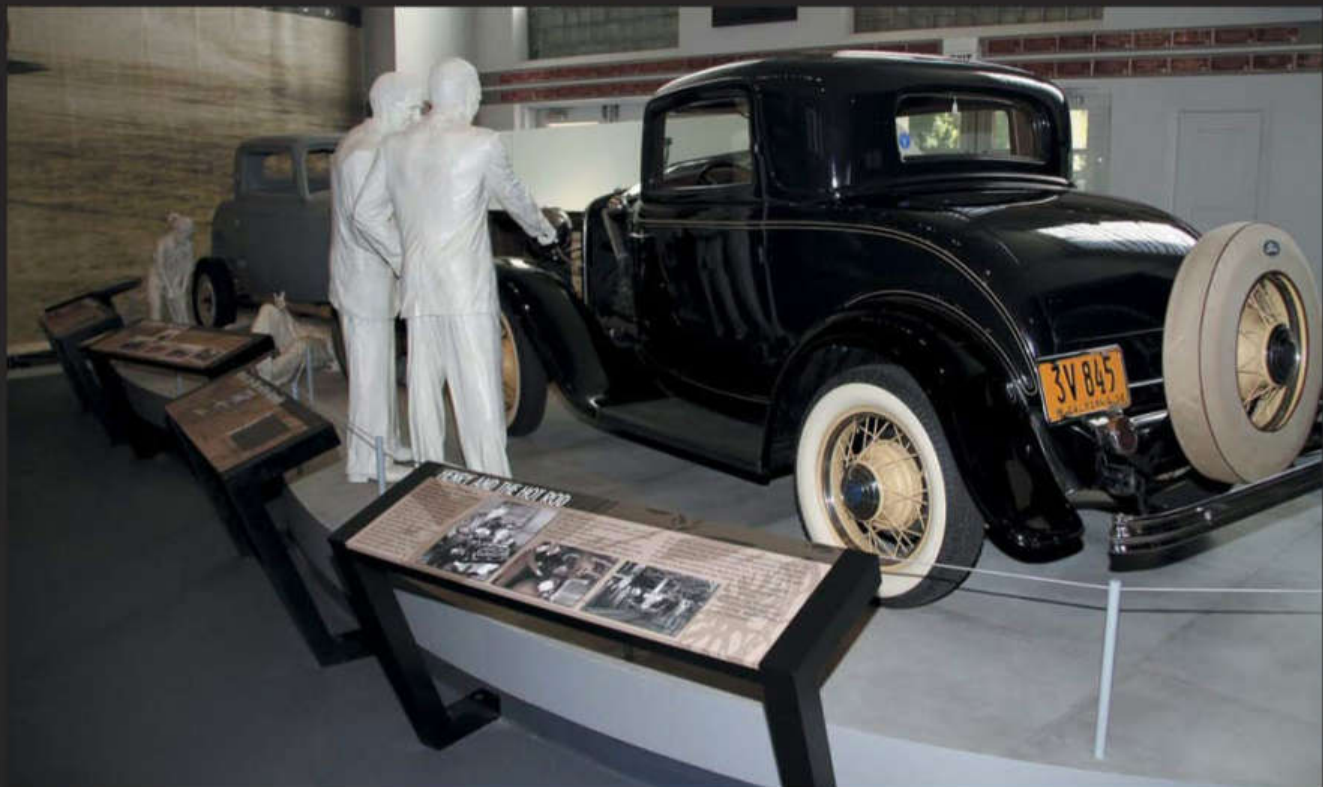
"The new Gallery of Speed is not just an exhibit, but an innovative and original learning experience providing a unique look into the fascinating world of hot rodding and motorsports," the NHRA Museum's Executive Director Larry Fisher said. "Here we will begin to tell the stories of the great American hot rod, and those who built and raced them, in a new light. We will not only celebrate the cars, but the people, the engineering, the science and the





# of Speed

The New Gallery of Speed Brings Years of America's Love Affair With Hot Rodding Vividly to Life



■ A '32 Ford featuring the company's first production V-8 that dominated hot rodding for decades. From the collection of John Lawson, Fresno, CA. Also featured, a '32 under construction as a hot rod. Featuring an original '32 Ford chassis and a souped-up Ford flathead engine, the car demonstrates what a hot rod might look like during the process of construction in an enthusiast's garage. From the collection of John Mumford and Roy Brizio Street Rods, South San Francisco, CA.



**I BELIEVE THAT THE NEW GALLERY OF SPEED WILL CAPTURE THE VISITOR'S IMAGINATION AND INSPIRE ALL AGES FOR YEARS TO COME. IT'S AN EXHIBIT OUR FOUNDER WALLY PARKS WOULD BE VERY PROUD OF.**

sheer audacity of those who pushed the limits in their pursuit of speed.”

The Gallery of Speed features five focal areas: The origins of hot rodding, land speed racing, the early days of the NHRA and the influence of custom car design. The immersive exhibit offers a fascinating assemblage of historical vehicles, artifacts, interactive touchscreens, images, oral histories, life-sized sculptures designed by Weldon Exhibits and other articles of historical and cultural significance.



■ The McMullen '32 Ford highboy roadster. After appearing on nine magazine covers, four record albums and in several television shows and movies, this is possibly the world's most famous street roadster. Featuring a supercharged small-block Chevrolet engine and iconic flames designed by the late “Big Daddy” Ed Roth, the car was named one of the 75 Most Significant Deuces for an exhibit celebrating the '32 Ford's 75<sup>th</sup> anniversary. Restored by Roy Brizio Street Rods, it's on loan from Mecum Auctions.



# Prestige Hobbies



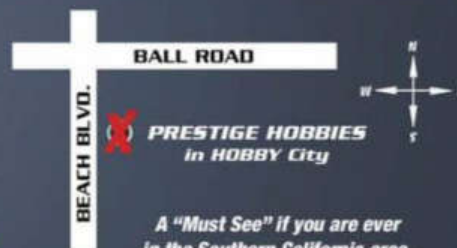
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The Gallery of Speed will ignite the visitor's quest for knowledge regarding this intriguing aspect of our culture. The exhibit is designed to be a fun learning experience combined with hands-on activities and touchscreens focused on S.T.E.A.M. (science, technology, engineering, arts and math). Visitors can

customize their own hot rod, learn the language of hot rodding and listen to candid and inspiring stories from NHRA founder Wally Parks and other motorsports legends.

"We wanted to develop a new approach to learning about the history of hot rodding, motorsports and the individuals who influenced American car

culture," said Greg Sharp, curator of the NHRA Motorsports Museum. "I believe that the new Gallery of Speed will capture the visitor's imagination and inspire all ages for years to come. It's an exhibit our founder Wally Parks would be very proud of."

The museum's newly renovated retail store offers a wide variety of unique and interesting gifts and keepsakes, providing visitors the opportunity to take a reminder of their experience with them.

The NHRA Museum is open Wednesday through Sunday, 10 a.m. to 5 p.m. For further information, visit [Nhrmuseum.org](http://Nhrmuseum.org). **MD**

■ **The Chrisman #25 dragster.** Arguably the world's oldest living hot rod, it is believed to have been built in the early '30s as a track car. It was raced at dry lakes time trials through the late '40s. In the early '50s, Art Chrisman raced it at Santa Ana dragstrip. In 1953 he lengthened it and added disc wheels to make it more suited to the new sport. It became the first dragster to exceed 140 mph. It made the first run at the first NHRA Nationals in 1955. It was restored by Chrisman to its 1953 trim and was gifted to the museum by Bill Lindig and family of Houston. It's in competition with The Albertson Olds dragster. In the late '50s, commercially manufactured dragster chassis saved racers money and allowed them to race safely. This car, based on a Chassis Research K-88 frame, took its name from Culver City, CA's Albertson Olds dealership. The team of Ronnie Scrima, Gene Adams, Leonard Harris and later Tom McEwen, won an amazing 12 consecutive Top Eliminator wins at Lions Drag Strip. At the sixth NHRA Nationals in Detroit, the team set Low Elapsed Time and beat 34 other dragsters to become the national champion. It was restored for the museum by noted Oldsmobile racer Don Ratican.



■ **The Beast III streamliner.** In 1952, Chet Herbert, a young Southern California entrepreneur in the camshaft business, decided to build a streamliner from scratch for competition at the Bonneville National Speed Trials. Aerodynamicist Rod Schapel designed the car based on computations and the results of testing a 1:10 scale model in Cal Tech's wind tunnel. Schapel then built the full-size body from fiberglass. Using a new Chrysler Hemi engine, it arrived a few days after Speed Week began. Driver Art Chrisman attained a one-way best speed of 238.095 mph and a two-way average of 235.991 mph, qualifying Chrisman as a charter member of the Bonneville 200 MPH Club and the Beast as the fastest single-engine car in America. The car was restored by Custom Auto of Loveland, CO and gifted to the museum by Dr. Mark Brinker, M.D. of Houston.

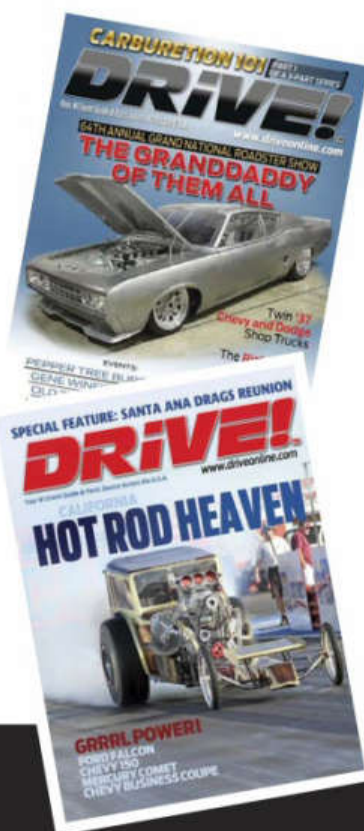




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- 31st annual CARQUEST Auto Parts NHRA Nationals**  
Feb. 20-22 · Phoenix
- 46th annual Amalie Motor Oil NHRA Gatornationals**  
March 12-15 · Gainesville
- 6th annual NHRA Four-Wide Nationals**  
March 27-29 · Charlotte, N.C.
- 16th annual SummitRacing.com NHRA Nationals**  
April 10-12 · Las Vegas
- 28th annual O'Reilly Auto Parts NHRA Spring Nationals**  
April 24-26 · Houston
- 35th annual Summit Racing Equipment NHRA Southern Nationals**  
May 15-17 · Atlanta
- 27th annual NHRA Kansas Nationals**  
May 22-24 · Topeka, Kan.
- 46th annual Toyota NHRA Summernationals**  
June 4-7 · Englishtown
- 3rd annual NHRA New England Nationals**  
June 12-14 · Epping, N.H.
- 15th annual NHRA Thunder Valley Nationals**  
June 19-21 · Bristol, Tenn.
- 9th annual Summit Racing Equipment NHRA Nationals**  
July 2-5 · Norwalk, Ohio
- 18th annual Route 66 NHRA Nationals**  
July 9-12 · Chicago
- 36th annual Mopar Mile-High NHRA Nationals**  
July 24-26 · Denver
- 28th annual NHRA Sonoma Nationals**  
July 31-Aug. 2 · Sonoma, Calif.
- 28th annual NHRA Northwest Nationals**  
Aug. 7-9 · Seattle
- 34th annual Lucas Oil NHRA Nationals**  
Aug. 20-23 · Brainerd, Minn.
- 61st annual Chevrolet Performance U.S. Nationals**  
Sept. 2-7 · Indianapolis

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- 31st annual NHRA Keystone Nationals**  
Oct. 1-4 · Reading, Pa.
- 30th annual AAA Texas NHRA Fall Nationals**  
Oct. 15-18 · Dallas
- 15th annual NHRA Toyota Nationals**  
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There are a lot of “what ifs” in everyone’s lives. It goes hand in hand with “coulda, shoulda, woulda.” When it comes to concept cars, it’s natural to say, “They should make that. I’d buy one.”

That was said about the cars that would become the Sting Ray, Thunderbird, Fairlane 500, Torino, Mustang, Viper, Prowler, EV-1, Nomad and the Batmobile. This process, however, has also given us the PT Cruiser, Mustang II, Neon, Corvair and Edsel.

No production car has received more notable concept variations than the Ford Mustang. Since its first clay model mockup in 1961, there have been hundreds of wild and some wacky ideas about its future look and possible appeal.

There have been two-seaters, targa toppers, chop tops, altered wheelbases and even a station wagon version. Some elements ultimately found their way into production. Other ideas were, thankfully, sent to the scrap heap.

As we close out this issue, here’s a look at some concept Mustangs that could have been.

**MD**





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